REPORT OF

Lake Superior-Mississippi River Canal Commission

TO THE

LEGISLATURE OF MINNESOTA

1914

STATE OF MINNESOTA

LAKE SUPERIOR AND MISSISSIPPI RIVER CANAL COMMISSION

TO THE LEGISLATURE OF THE STATE OF MINNESOTA:

The undersigned, Lake Superior and Mississippi Canal Commission, submits the following report:

Pursuant to Joint Resolution Number 7, adopted by the Legislature of 1913, the Governor of the State, Chairman of the Railway and Warehouse Commission and Engineer of the State Drainage Board were constituted a commission to be known as the Lake Superior and Mississippi Canal Commission. Said resolution was approved March 31, 1913, and shortly thereafter the commission was organized.

HISTORY OF CANAL BETWEEN LAKE SUPERIOR AND THE MISSISSIPPI RIVER.

For more than sixty years prior to the creation of the Lake Superior and Mississippi Canal Commission, as above stated, the project of constructing a canal from Lake Superior to the Mississippi River had been agitated in the Northwest, and particularly in the State of Minnesota. The project has been considered by various legislatures of the State of Minnesota since the year 1857. In 1857, by Chapter 55 of the Laws of the Special Session of the Territorial Legislature, the Mississippi River and Lake Superior Ship Canal Company was incorporated, with power to construct a canal from the Mississippi River to Lake Superior and with authority to condemn lands therefor and collect tolls thereon.

In 1874 the Legislature passed a joint resolution memorializing Congress in favor of a survey between St. Croix Falls and the Upper Mississippi River and Lake Superior with a view to the construction of a canal connecting the same.

In 1875 an act was passed by the Legislature (Chap. 154 G. L. 1875) authorizing a survey of a canal route from Lake Superior to the St. Croix River and appropriating Three Thousand Dollars for the expense thereof.

In 1887 a joint resolution (No. 12) was passed by the Legislature memorializing Congress for an appropriation of Twenty-five Thousand Dollars for a final survey of a canal route between Lake Superior and St. Croix River.

In 1893 an act was passed authorizing counties, towns, villages and cities to grant municipal aid in the construction of canals and waterways, and in 1913 the Legislature passed the joint resolution above mentioned creating this commission.

LEGISLATION BY CONGRESS OF THE UNITED STATES.

As appears from the foregoing, several routes for the canal were proposed from time to time, one via the St. Louis River connecting with the Mississippi River above St. Cloud, another via the Rum River connecting with the Mississippi above Minneapolis, and the third via the Brule and St. Croix Rivers. In 1894 Congress appropriated Ten Thousand Dollars for an examination and survey of the several routes above mentioned for the purpose of determining which was the most feasible route. Pursuant to this action the United States Government Engineers made a very careful survey of the three proposed routes and the result was that the route via the Brule and St. Croix Rivers was determined to be the most feasible and practicable of all routes mentioned. It was ascertained and determined that the Brule-St. Croix route was engineeringly feasible and practicable and presents no great or unusual obstacle. In 1899 Congress directed a further examination of the Brule-St. Croix route for the purpose of ascertaining whether the project was one which should be undertaken by the United States Government. United States Engineers again reported the canal to be practicable and feasible from an engineering standpoint, but concluded that the project was not an urgent necessity.

Again in 1909 Congress directed a further examination to determine whether the canal was commercially feasible. This resulted in a report by the United States Engineers to the effect that the canal was not commercially feasible on account of railway competition.

In 1912 Congress directed a final survey and examination provided the United States Engineers determined the canal to be commercially feasible, that is, whether its construction would result in public benefit by reducing freight rates. The Board of Army Engineers convened on January 14, 1913, had a public hearing at Duluth, and on May 14, 1913, made a report confirming the several prior reports made by United States Engineers to the effect that the original Brule-St. Croix

route was practicable and feasible from an engineering standpoint but not commercially feasible.

COMMISSION APPEALS FROM REPORT OF LOCAL BOARD OF UNITED STATES ENGINEERS.

It will be observed from the foregoing that the report of the local board of army engineers was practically adopted before this commission was organized. All of the prior reports of army engineers to the effect that the canal was not commercially feasible had been allowed to pass without question. Prior to that time there was no organization, private or public, capable of prosecuting an appeal with any effect. It seemed desirable in the public interest, in order to promote the construction of the canal, that an appeal should be taken from the local board of army engineers to the General Board of Army Engineers at Washington so that the merits of the project might be given such publicity and attention as they seemed to deserve.

Within thirty days after the report of the local board of army engineers was made, this commission appealed to the General Board of Army Engineers at Washington and prepared to present facts and figures bearing upon the commercial feasibility of the canal.

The report whereby the local board of army engineers arrived at the conclusion that the proposed canal is not commercially feasible is an imposing document of fifty printed pages. It discusses a great many questions, all relating to transportation terminals and cost of hauling freight on railways and upon waterways, and particularly devotes considerable space to the question of terminal charges and handling freight from boat to rail and from rail to boat. The work of collecting data and statistics and evidence to correct the errors of fact and conclusions found in the report of the engineers was very extensive and difficult and required a great deal of time. The commission employed an expert statistician upon this work for about six months and then the work of completing the investigation and putting the material in form of arguments was turned over to George H. Sullivan, of Stillwater, Minnesota, with the understanding that his services should be absolutely free to the commission.

On June 30, 1914, oral arguments were made at Washington before the General Board of Army Engineers. Senator Knute Nelson, Governor Eberhart, Congressmen F. C. Stevens, C. R. Davis and George Smith, and Senator George H.

Sullivan, of Stillwater, made oral arguments in favor of the canal and the Commission filed a printed argument made by Mr. Sullivan. The printed arguments are made a part of this report and an inspection thereof will show how carefully and elaborately the case in favor of the canal was made.

The Legislature of the State of Wisconsin, in 1913, provided for the appointment of a canal commission similar to this commission and with similar powers and authority, and such commission joined with the Minnesota Commission in prosecuting the appeal and in arguing the same at Washington.

At the time of making this report no decision has been rendered by the General Board of Army Engineers at Washington.

We have made a most careful and painstaking examination, investigation and analysis of the question of the commercial feasibility of the Lake Superior and Mississippi River Canal. We have carefully examined and tested the facts and theories set forth in the report of the local board of army engineers and we are convinced by our examination and investigation, by every expert, every test and every authority that we have consulted, and from our own conclusions, that the report of the local board of army engineers that the canal is not commercially feasible is erroneous. We are confident that the canal is feasible and practicable, physically, engineeringly and commercially, and that the construction thereof will be a great public benefit which will result in a large saving, both to producer and consumer, in an aggregate much in excess of the interest on the cost of the canal, its maintenance and operation.

The completion of the Panama Canal and its operations thus far indicate that it is only by the improvement and actual use of the Mississippi River in connection with the Panama Canal that the States bordering upon the Mississippi River, particularly north of St. Louis, can retain their present prosperity. Under present conditions freight can be transported from points in Ohio to the eastern seaboard, thence by sea and the Panama Canal to points on the coast and thence transported to interior points for less than the freight rate from St. Paul or Minneapolis to such interior points. It is only by utilizing the Mississippi River and the Great Lakes in connection therewith by means of this canal that such adverse freight conditions can be overcome.

We recommend that the Legislature provide for the continuing existence of the Canal Commission and appropriate

sufficient money to enable it to carry on the work of promoting the construction of such canal. We believe that the construction of such canal by the United States Government is a great public necessity and will result in materially promoting the prosperity of the Northwest and of the whole United States.

We earnestly invite the attention of every member of the Legislature to the written arguments submitted to the General Board of Army Engineers at Washington which follow and are made a part hereof.

Dated December 31, 1914.

Respectfully submitted,

LAKE SUPERIOR AND MISSISSIPPI CANAL COMMISSION.

By Adolph O. Eberhart, Governor and ex-officio Chairman.

Ira B. Mills, Secretary.

IN THE MATTER OF

Lake Superior and Mississippi Canal

APPEAL OF MINNESOTA
AND WISCONSIN COMMISSIONS

DATA AND ARGUMENT

IN THE MATTER OF THE PROJECTED CANAL FROM LAKE SUPERIOR TO THE MISSISSIPPI RIVER VIA THE BRULE AND ST. CROIX RIVERS.

Appeal of Lake Superior and Mississippi Canal Commission of the State of Minnesota from the report of the Local Board of United States Army Engineers at Duiuth, Minnesota, dated May 14, 1913, reporting that the proposed canal is not now commercially feasible and practicable.

To the General Board of Engineers for Rivers and Harbors,
Washington, D. C.

The Lake Superior and Mississippi Canal Commission of the State of Minnesota having heretofore duly appealed in writing from the report of the Local Board of United States Engineers at Duluth, dated May 14, 1913, in and by which report it was determined by said Local Board of Engineers that the proposed canal from Lake Superior to the Mississippi River via the Brule and St. Croix Rivers, is not now feasible or practicable, submits the following statements, data and statistics, with the request that upon due consideration thereof said report of said Board of Engineers at Duluth be not concurred in by the General Board of Engineers for Rivers and Harbors. The Lake Superior and Mississippi Canal Commission of the State of Wisconsin joins with the Canal Commission of the State of Minnesota in the submission of this statement and in the request that the report of the local board be not concurred in, and like request is also made by and on behalf of the Association of Commerce of the City of Minne-

apolis, the Association of Commerce of the City of St. Paul, and also all other cities, municipalities, representative commercial bodies and citizens of the Upper Mississippi Valley and the Northwest who appeared before or who addressed communications to the local Board of Engineers in favor of the project.

*For resolutions of Minnesota and Wisconsin Legislatures creating canal commissions of such states see Exhibits 14 and 15.

DESCRIPTION AND OUTLINE OF PROJECTED CANAL.

1. The project under consideration is the construction of a canal from Allouez Bay, which is a part of the Duluth-Superior harbor on Lake Superior to the mouth of the St. Croix.

Distance from the mouth of St. Croix to the Allouez Bay, the Superior end of the canal, 210 miles.

Distance from mouth of St. Croix on Mississippi River to St. Paul, 27 miles; to Minneapolis, 40 miles, and to various Mississippi ports and terminals.

Open river navigation from Taylors Falls on the St. Croix to Minneapolis, on the Mississippi, 92 miles.

Canalized section from Duluth-Superior Harbor to Taylors Falls, 160 miles.

Minneapolis to end of canal, Allouez Bay, 250 miles.

Elevation of summit-level above Lake Superior—411 feet.

Elevation of summit-level above Mississippi at mouth of St. Croix River—344 feet.

Locks and dams—16 locks 170x35 feet and 8 hydraulic lifts—6 feet low-water depth on mitre sills.

Waterpowers—Engineers estimate 21,000 horse-power on Brule and St. Croix, not including 15,000 to 18,000 H. P. on partially completed high-dam on Mississippi between St. Paul and Minneapolis; other estimates by citizen engineers up to 50,000 h. p.

Cost of project (not including hydroelectric development) $7,815,000.

Cost for operation, maintenance and 3½% interest on investment—$420,000 per annum.

LENGTH OF CANAL.

2. The length of the canal from Lake Superior is given in the report of the local board as 222 miles from the Duluth canal to the mouth of the St. Croix River. This is an error. The distance should be calculated from the junction of the canal with Allouez Bay, which is a part of the Duluth-Superior Harbor, and which point is the northern terminus of the canal. This is clearly stated in the reports of the United States Army Engineers, H. D. No. 204, pages 4-7, Sixty-first Congress, Second Session. This makes the distance from the City of Minneapolis via the Mississippi River, St. Croix River and the northern terminus of the canal 250 miles instead of 262 miles.

THE PROPOSED CANAL IS ENGINEERINGLY FEASIBLE TO CONSTRUCT AND OPERATE.

3. That it is entirely feasible and practicable to construct, maintain and operate the proposed canal is thoroughly demonstrated by the several reports made by United States Army Engineers who have made several examinations and surveys of the route pursuant to congressional action. The details of such examinations and surveys, together with data and statistics as to the cost of construction, maintenance and operation, will be found in the following reports:

August 30, 1909, report of Lieut. Col. Graham D. Fitch of preliminary examination in compliance with River and Harbor Act of March 3, 1909. (House Document No. 304 61st Congress, 2nd Session.)

June 14, 1899, report of Major Clinton B. Sears, in compliance with River and Harbor Act of March 3, 1899. (House Document No. 59, 56th Congress, 1st Session.)

March 10, 1896, report of Major Sears with detailed report by Assistant Engineer John Krey. (House Document No. 330, 54th Congress, 1st Session, pages 2390-2454 of Chief of Engineers, 1896.)

Each of the foregoing reports finds the projected canal feasible and practicable to construct; that a six foot canal can be constructed and operated.

Cost of construction.....$7,815,000.00
Cost of operation and maintenance and 3½% interest on the investment of the government $420,000.00 per annum.

No government or other engineer has ever reported that the canal is not practical from an engineering standpoint.

COMMERCIAL FEASIBILITY OF CANAL.

4. The only question in issue is the commercial expediency or feasibility of the canal, or as stated by the local board at Section 30 of the report:

> "Will the saving in freight to the public on the probable commerce through the canal be equal to the $420,000.00 annual expense to the government for operation, maintenance and interest on the investment?"

In other words: Can the canal compete with the four lines of existing railways from Duluth-Superior to the Twin Cities and effect a saving of $420,000.00 per year to the public?

IMPORTANCE OF THE SUBJECT.

5. It is elementary that the cost of all transportation in the last analysis is borne by the consumer and is a tax from which none can escape. The greatest tax borne by the individual citizen of the United States is the tax paid for railroad transportation in the form of railway freight. For the year 1906-7 the total gross revenue of the railways of the United States was $2,875,689,500.00, or about $30.86 per capita, or a tax of $154.30 per annum for each family of five persons.

In the same year the average amount per capita collected by the government of the United States in tariff duties on imported goods was $3.84. So the railway transportation tax was more than eight times as great as the tariff tax. During the same year the average receipts of the United States government from all sources was $9.84 per capita.

In the nature of things it is impossible for the individual to know or ascertain how much he pays for transportation

tax or tariff tax. He is paying a slight amount of each form of such whenever he buys any article which has been transported by railway or affected directly or indirectly by the tariff. However, he usually remembers the amount he pays directly in the city, county or state taxes, and has a receipt to refresh his memory thereof. In the year 1902 the total revenues and taxes paid to all the states, counties, cities, towns, villages, districts and all other political subdivisions in the whole United States, added to the total revenues of the United States government for that year, amounted to $1,791,895,522.00.

For the same year the gross earnings of railways amounted to $1,922,703,896.00 showing that the transportation taxes paid to railways in that year exceeded all other taxes paid for all public purposes in the United States by the enormous sum of $130,808,374.00.

The bureau of railway news and statistics of the United States records a railway freight movement for the year ending June 30, 1913, of 300,000,000,000 ton miles at an average rate of 7.27 mills per ton mile or total freight bill of $2,181,000,000. The same authority gives total gross railway revenue for the year 1913 as more than $3,000,000,000.

While the tax exacted from the consumer may be estimated as above at $30.84 per capita, it is utterly impossible to even approximate the total toll or amount per capita exacted from the producer whose products are diminished in selling price by deductions made for freight from place of production to consumption. However, the above considerations clearly indicate the immense tax upon producer and consumer occasioned by railway transportation. It would, therefore, seem to be of the highest importance that every possible means available be resorted to which will result in lessening this enormous railway transportation tax which bears so heavily upon each individual citizen.

CANAL OR WATERWAY VS. RAILWAY TRANSPORTATION.

6. Authorities on transportation, as we understand it, agree to the proposition that it requires very much less power

to move the same amount or weight of freight upon a waterway or canal than by any other method of transportation. The equivalent of a horse-power can move two tons at the rate of three miles per hour on a fairly level wagon road, fifteen tons in a car on a railway, and ninety to one hundred tons in a boat of proper shape on a waterway of width and depth adapted to its use. The average rate received by railways in the United States in 1907 was 7.82 mills per ton mile; in 1913, 7.27 mills per ton mile.*

*For table of comparison of rail rates in U. S. and water rates in Europe, showing water rates much lower than rail, see Exhibit 11, Final Rep. Nat. Waterway Com. P. 568.

RAILWAY RATES TEND TO INCREASE.

7. Current history clearly indicates that the tendency of railway rates is to increase rather than decrease. By elimination of grades, increase in efficiency and capacity of equipment of locomotives, improvements in terminals and other economies effected by railways in recent years, it would seem that the minimum cost of railway transportation was reached last year. Through every part of the country railways are insistently clamoring for an increase in rates. They cite figures and statistics indicating their inability to operate railways at present rates without loss such as they claim will result in inefficient service or ultimate bankruptcy. They assert that it is impossible to raise capital to make needed extensions and improvements so that it may well be assumed that the outlook is for increased rather than decreased railway rates. (F. R. Nat. W. Com. P. 575.) There are pending applications of railways to raise the rates between the Twin Cities and Duluth and also an application to raise lake and rail rates from Twin Cities to eastern points. There are pending before the Inter-State Commerce Commission applications of the railways of the country for a horizontal increase in rates of 5%. A horizontal raise of 5% would add to the freight railway tax to be paid by the public the enormous sum of $109,050,000 annually. As indicated hereafter that amount and more could

be saved to the public by removing the railway shackles from water-borne commerce permitting waterways to perform their natural function of carrying freight which should be carried on water at a saving to the public.

8. The average rate for bulk freight on the Great Lakes is 8-10 of a mill per ton mile. It is estimated by army engineers that when the improvements on the Ohio river are finished transportation can be conducted thereon for one-half a mill per ton mile. On the old Erie Canal, under conditions decidedly unfavorable to low cost, such as old type wooden boats of small tonnage capacity, antiquated towing methods, absence of adequate terminals and modern machinery for loading and unloading, railway discriminations against and practically boycotting of canal freight, the rate was two mills per ton mile. On the new Erie Canal, with modern terminals and terminal facilities, controlled by the State, with canal traffic protected by the State and United States, reliable authorities estimate the cost per ton mile will not exceed from one-half to one mill. Rates on waterways where the most modern type of boat is used, with adequate terminals and machinery for loading and unloading, by consensus of all transportation authority in the United States and Europe ought not to exceed from one-half a mill to two mills per ton mile.

It is in the nature of the case that water transportation is less costly and more economical than railway transportation, unless unnatural and artificial obstacles prevent the use of the waterway under favorable conditions. The expense of equipping a transportation line, at least so far as the boats are concerned, is but trivial in comparison with that of constructing a railway. Waterways cost less to maintain: have almost unlimited capacity and hence are not liable to congestion and frequently deliver freight more rapidly than railways. Waterway transportation has a decided advantage in that the waters are free and any one having the requisite capital and ability can engage in the business. This tends to create competition and to prevent monopoly. Indeed, it may be asserted, as a general proposition that in any highly advanced country,

it is extremely desirable that means be afforded for the carriage of freight not only by rail but by water as well. It is a matter of common occurrence that in years of great crops or unusual prosperity the railways of the country have been unable to provide for the prompt and efficient performance of their duties as common carriers. Stagnation and congestion of traffic occur entailing enormous losses. The existence of this condition affords an independent argument for the development of transportation routes by water, even in localities where shippers mainly depend upon railways.

REPORT OF LOCAL BOARD FOUNDED UPON ARTIFICIAL AND PREVENTABLE OBSTACLES.

9. The report of the local board does not find that transportation by canal is economically inferior to railway transportation, nor that **canal transportation is not cheaper** than railway transportation, but finds in effect that canal transportation will be hampered and prevented by existing artificial, unnatural and wholly unnecessary obstacles, mainly the result of railway hostility and the manipulation of agencies controlled by railway ownership of terminals, terminal facilities and general control of freight at points of origin and destination; railway discriminations against water borne traffic and practices, amounting practically to boycotting water traffic. It is because of the artificial, unnecessary and preventable obstacles found to exist by the local board that they report the canal to be not commercially feasible. These obstacles the local board assumes will continue to exist, but we think it is demonstrated herein that all of the obstacles to water transportation may and will be prevented or swept aside.

ECONOMIC LOSS TO PUBLIC AND CONSUMER BY REASON OF RAILWAYS DIVERTING FREIGHT FROM WATER TO RAIL, WHICH COULD BE CARRIED CHEAPER BY WATER.

10. It will be conclusively shown herein that a large percentage of freight, which could be transported by water at

less cost than by rail, is diverted to rail by the indefensible boycotting of water traffic resorted to by railways. The resulting loss of the difference in cost between water and rail transportation is borne by the consuming public. The railway makes up any loss occasioned by water competition from higher freight charges to other points not affected by water competition, **but the public pays the whole railway freight bill.**

If the amount of freight so diverted from water to rail be only 15% of the total railway freight paid in 1913, it would be $327,150,000 annually. If the difference in cost between rail and water transportation be only 33% the loss to the public by reason of such unnatural diversion from water to rail amounts to the enormous sum of $109,050,000 per annum.

If the railways would permit or be required to allow freight to go by water which can and would naturally be transported by water cheaper than by rail, it is quite possible there would be no necessity of increasing present railway rates.

FINDINGS AND CONCLUSIONS OF LOCAL BOARD.

11. The local board of engineers arrive at the conclusion that the proposed canal is not commercially feasible by the following findings, statements, reasoning and conclusions, which may be grouped as follows:

DECADENCE OF INLAND WATERWAYS AND CANALS.

A. The board calls attention to the general decline in inland waterway and canal traffic. They point to the decline of traffic on the Erie Canal from 4,608,581 tons carried in 1880, being 18% of the total freight moved by rail and canal between Buffalo and New York, to 2,385,491 tons in the year 1906, an actual decrease in freight of nearly 50% and a decrease in total freight carried between Buffalo and New York from 18% to 3%. They quote figures purporting to show a decline of traffic on the upper Mississippi River of 85% from 1889 to 1906. They also quote figures showing decline of traffic on the Ohio River, lower Mississippi, Missouri and Illinois Rivers, and say that in 1909, 4500 miles of canals had been constructed in

the United States, of which 2444 miles, costing $80,000,000.00 had been abandoned, and at Section 112 say that the ultimate fate of the proposed canal, if constructed, would only add to the figures of abandoned canals. The only inference possible to draw from the statements of the local board with reference to inland waterways on canals and rivers is that traffic thereon is no longer profitable or practicable; that it is dying out and that inland waterway projects are unworthy of improvement or of assistance from the general government or any source and consequently railway transportation is better, cheaper and to be preferred to inland waterway transportation.

In passing we note that in citing figures showing decline of traffic on the Upper Mississippi River the local board, (Sec. 43), gives the figures of the tonnage as follows:

Year	
1889	3,947,364
1906	595,885

The U. S. Army Engineer's office at Rock Island, in response to an inquiry made by the Minnesota Commission, in a letter addressed to George H. Sullivan, dated April 16, 1914, gives the following figures showing details and total tonnage on Upper Mississippi River for the years 1889 and 1906, as follows:

1889	Tons
Logs and lumber	3,760,389
Miscellaneous freight	320,743
U. S. Material	485,438
	4,566,579
1906	
Logs and lumber	2,630,147
Miscellaneous freight	1,001,867
U. S. material	215,311
	3,847,319

These figures show a decline in total traffic of 719,260 tons, or 15%, instead of a decline of 3,351,479 tons or 85% as stated in Sec. 43 of the report of the local board.

The decline in the item of logs and lumber is 1,130,257 tons, or 24%.

It is well known that shipments of logs and lumber have declined because of extinction of the pine forests of Minnesota and Wisconsin.

But it appears that there was an actual increase in all other freight on the Upper Mississippi during the period in question:

1889, miscellaneous freight and U. S. Material, 806, 181 tons to 1906, miscellaneous freight and U. S. material, 1,217,178 tons or an increase of practically 50%.

HANDLING AND TERMINAL CHARGES AND RAILWAY HOSTILITY TO WATERWAYS AND CANALS.

B. With reference to this particular project the local board finds certain terminal charges, such as 25c per ton for loading coal upon and 25c for unloading coal from canal barges; 25c per ton deterioration in value of coal due to one extra handling by clam shell over rail transportation; 25c for delivery from canal dock to carload consumer; certain elevator charges for loading and unloading grain; and the existence of certain terminal, dock and storage charges upon freight and general merchandise which prevent freight from being transported upon the canal at as low a rate as it may be carried upon existing railways. In this connection the board also find, as reasons why the canal cannot carry general merchandise or package freight, including salt, sugar, groceries, cotton and woolen goods etc., that lake vessels are owned by railway companies and therefore will not deliver freight to or accept freight from canal boats or barges, except at local or higher rates than when such freight is delivered to or received from railway lines. That the canal carriers will be deprived of all freight known as lake and rail freight, i. e. freight originating upon railways either at eastern or western points, a part of the carriage of which is by rail and part by lake, on account of discrimination against canal freight by railways. It is found in effect that through their control and ownership of termi-

nals, docks and storage warehouses at Duluth, Superior, Buffalo and other lake harbors, ownership of lake vessels, canal terminals and boats on the Erie Canal, agreements between eastern and western railways and other agreements between railways, such railways can and will divert all traffic to rail and lake lines under common control of railways. That ownership by railways of terminals permits them to make a through rate for the entire carriage from the point of origin of freight to its destination, including the terminal charges, storage charges, dock charges, loading and unloading charges, so that the rate for delivery of freight from origin to destination, including all charges, is lower than it is possible to transport the freight through an independent agency such as the proposed canal, transporting the freight only at one end or upon one portion of the entire route, and being subject to terminal charges and other exactions controlled through railway influences in the manner described so as to effect any saving of freight at all when such charges are added and a local or higher rate exacted by the railways and lake carriers controlled by railways transporting such freight for the remainder of the distance. While it is clear that freight transported by canal from Duluth-Superior to the Twin Cities originating at Eastern points or freight originating at the Twin Cities, or tributary thereto, transported over the canal destined for eastern points, only requires one extra handling, that is, on west bound freight, the extra handling from lake carrier to canal boat, and on east bound freight the extra handling from railway car to canal boat of that portion not loaded directly from mill dock or elevator to canal boat, yet the terminal charges for loading and unloading, assumed in the report seem to the local board sufficient to deprive the canal of all freight. Such charges in fact are cited by the local board as demonstrating that freight will not and cannot move over the projected canal except at a greater rate than such freight is now moved by rail or by existing lake and rail rates. In effect it is also found that the refusal of railways to make joint and other rates or to divide traffic upon the basis upon which lake carriers and

railways which control such lake carriers now divide the same or upon any equitable basis, is found as one of the insurmountable obstacles to the success of the projected canal.

In other words, the hostility of existing railway lines to water traffic and the various methods by which railways have in the past destroyed inland waterways and canal traffic, including traffic upon all of the rivers and canals whose traffic has been partially or wholly destroyed, according to the report of the local board are found and assumed as conditions that will continue as insurmountable obstacles to freight traffic upon the waterways and canals of the whole country and of such a character as to absolutely prohibit the proposed canal from receiving or transporting any freight whatsoever.

TOTAL TONNAGE AVAILABLE TO CANAL.

C. The board finds the total bulk freight or tonnage available for transportation on the proposed canal and of the character usually transported by canal, such as coal, iron, steel, general merchandise, flour, grain, etc., to be 3,295,000 tons. This tonnage is calculated on the basis of the tonnage actually carried by railways between the Twin Cities and Duluth-Superior for the year ending June, 1912, as follows:

Hard and soft coal and iron	1,954,568 tons.
Flour	223,170 tons.

The railroads in question estimate the foregoing figures for hard and soft coal and iron constitute 80% of the bulk tonnage moving south. The board then find the additional local population of the canal zone amount to 22% of the population of the termini and hence add 22% to the actual coal shipments of 1912 and 12½% to the flour tonnage; then assuming the result to be 80% of the total bulk freight moved between the Twin Cities and Duluth-Superior, find the total bulk shipments for the year 1912, allowing the above increases of 22% for coal and 12½% for flour for the local consumption of the canal zone, as follows:

Soft coal.....	1,724,000 tons,	52.3% of all
Hard coal.....	658,200 tons,	20.0% of all
Iron and steel..	2,400 tons,	0.1% of all
Flour	251,400 tons,	7.6% of all
Grain	329,500 tons,	10.0% of all
Gen. Mdse.	329,500 tons,	10.0% of all
Totals	3,295,000 tons	100.0%

The figures and percentages so arrived at are assumed by the board as the total tonnage tributary to the canal.

We do not agree that the figures or results or that the method of such computation is correct, nor, that the question should turn upon the tonnage of 1912. We think the coal tonnage and bulk shipments are largely in excess of the amount estimated by the board for the year 1912.

We note that while the total shipments of hard and soft coal for 1912, after adding 22% for increased consumption in canal zone, are found to be

Soft coal	1,724,000 tons
Hard coal...	658,200 tons
Total	2,382,200 tons

yet at Section 69 the local board say **actual** shipments of coal from Duluth to Twin Cities and Minnesota Transfer for 1912 are stated to be

Hard Coal ..	1,724,000 tons
Soft Coal ...	658,200 tons
	2,382,200

Adding 22% to the actual shipments, according to method of local board increases the available coal tonnage for 1912 524,084 tons, or a total of 2,906,284.

We reproduce statement received from Minnesota Railway and Warehouse Commission in April, 1914, of total tonnage actually shipped by railways from head of lakes to Twin Cities for years ending June 30, 1909, 1910, 1911, 1912 and 1913.

		North bound.	South bound.	Total.
Northern Pacific Ry.	1909	368,507	813,780	1,182,287
C. St. P. M. & O. Ry. ...	1909	143,168	324,773	467,941
Great Northern Ry.	1909	238,274	555,507	793,781
Total for	1909	747,929	1,694,060	2,444,009
Northern Pacific Ry.	1910	433,940	946,872	1,380,812
C. St. P. M. & O. Ry. ...	1910	137,867	379,759	517,626
Great Northern Ry.	1910	261,640	598,202	859,842
Total for	1910	833,447	1,924,833	2,758,280
Northern Pacific Ry.	1911	466,166	1,097,676	1,543,842
C. St. P. M. & O. Ry. ...	1911	137,213	417,137	554,350
Great Northern Ry.	1911	271,039	722,835	993,874
Total for	1911	854,418	2,237,648	3,092,066
Northern Pacific Ry.	1912	446,360	1,447,840	1,893,200
C. St. P. M. & O. Ry. ...	1912	77,676	438,487	516,163
Great Northern Ry.	1912	230,406	844,394	1,074,800
Total for	1912	753,442	2,730,721	3,484,163
Northern Pacific Ry.	1913	663,480	1,637,264	2,300,744
C. St. P. M. & O. Ry. ...	1913	202,784	371,823	474,607
Soo Line (See note)....	1913	47,815	169,342	217,157
Great Northern Ry.	1913	282,885	714,891	997,776
Total for	1913	1,096,964	2,893,320	3,990,284

Note: From July 15th, 1912, to June 30th, 1913.

This shows increase in total shipments in four years from 2,444,009 tons to 3,990,284 tons or 63%, or more than 15% per annum. It shows total shipments 1912 3,484,163 tons. It shows that the Soo line management did not consider railway competition between head of lakes and Twin cities as any sufficient bar to the building of a new line of railway in 1913. We insist that the total tonnage available for the canal should be determined not on the basis of 1912 but on the basis of what it will be at the time of the completion of the canal, say 1920. The annual increase for the four year period prior to 1912 being more than 15% in 1920 it should be more than 120 per cent over the 1912 figures. This would more than double all the figures of the local board and would give an available coal tonnage of approximately 5,000,000 tons and other tonnage in proportion.

AVERAGE FREIGHT RATE ON PROPOSED CANAL.

D. The local board estimate the freight rate on the proposed canal would be the same as the freight rate on the Erie Canal, which the board finds to be three mills per ton mile, and taking the distance at 260 miles find the average canal rate will be 78c per ton. ..s shown later herein this rate should not exceed two mills per ton mile or 50c per ton.

EXISTING RAIL RATES BETWEEN DULUTH-SUPERIOR AND ST. PAUL AND MINNEAPOLIS.

E. The board finds existing rail rates between Duluth-Superior and St. Paul and Minneapolis, January 1913, as follows:

Coal, hard	$1.25	Iron, (bar or band)	$1.50
Coal, soft	.90	Iron, pig	1.12
Wheat	1.00	Lime	1.20
*Flour	1.00	Rails	.90
Coarse grain	1.00	Salt	1.00
Lumber	1.20	Sand	1.00
Structural iron	1.50	Stone	1.00
Building stone	1.00	Stone, crushed	.80
Iron castings	2.00	Suga*	1.60
Cement	1.00		

*One road charges $1.50.

THE LOCAL BOARD THEN DETERMINED THE AVERAGE RAILROAD RATES ON ALL COMMODITIES.

F. "The average rail rate for iron may be taken as the average rate on the five kinds or $1.40. The general ...erchandise rate may be taken as the average on stone, cement, lime, salt and sugar, or $1.16. The average rate on all freight may thus be determined:

Soft coal	1,724,000	tons at	90c	$1,551,600
Hard coal	658,200	tons at	$1.25	822,750
Iron and steel	2,400	tons at	$1.40	33,600
Flour	251,400	tons at	$1.00	251,400
Grain	329,500	tons at	$1.00	329,500
Gen. Mdse.	329,600	tons at	$1.16	382,220
Totals	3,295,000	tons		$3,371,070

$\frac{3,371,070}{3,295,000}$ = $1.024, the average rail rate on all commodities."

In determining this rate the board multiply the number of tons of each commodity shipped in 1912 by the rate on such commodity and after adding the amounts together divide the total by the number of tons, and thus find an average rate of $1.024. In passing we note the general merchandise rate is taken as the average rate on stone, cement, lime, salt and sugar, but there is no such computation of the amount of the several commodities included in general merchandise, in reaching the average stated, such as is used with reference to all the other commodities. But the rate per ton for each of the several commodities included under the term "general merchandise" are added together and divided by one number of such commodities instead of the total amount shipped. This method is obviously improper and the result inaccurate because not based upon proper data or computations. Sugar takes a rate of $1.60 a ton and is one of the largest items in the list.

AMOUNT OF FREIGHT CANAL MUST TRANSPORT TO BE COMMERCIALLY FEASIBLE.

G. The local board say: "If the average canal rate of 78c be subtracted from the average rail rate, $1.024, it leaves $0.244 as the difference which goes to reimburse the United States for its canal expenditure." The board therefore finds that the canal must haul annually 1,647,500 tons, or 50% of the estimated traffic for the fiscal year 1912, at a saving of $0.244 per ton in order to be commercially feasible. To the claim that the total freight will increase from year to year the board points to the history of the Erie Canal and other waterways as showing there will be no increase in canal traffic, but, on the contrary, a diminution or loss therein. The board say that a reduction of 10c per ton in freight will not secure the traffic for the canal because the service on the railroads is better and quicker.

THE BOARD FINDS THE CANAL WILL NOT CARRY COAL OR ANY COMMODITY OR FREIGHT WHATSOEVER.

H. The board then takes up the several commodities us-

ually carried on canals, such as coal, iron, steel, grain, flour, etc., upon the authority of Julius Barnes, Messrs. Little and Hall, and the authorities quoted in the report, and proceeds item by item to find that no commodity or freight whatever can be carried on the canal at any saving whatever below existing railway rates. In fact the board finds that when the extra handling, loading and unloading charges occasioned by the use of canal boats as a means of transportation are considered, that no commodity whatsoever could be transported on the canal without losses as follows:

LOSSES ON CANAL TRANSPORTATION.

	Losses.
Soft coal	73c per ton
Hard coal	3c per ton
General merchandise	12c per ton
Grain, from $0.135 to	41c per ton
Flour	11c per ton

And these losses all without any account being taken of the loss to the United States or cost of maintenance, operation and 3½% on the investment equaling $420,000 a year, or 25c per ton on 1,647,500 tons.

LOSSES FOUND BY THE LOCAL BOARD WHOLLY DUE TO TERMINAL CHARGES, COST OF LOADING AND UNLOADING, RAILWAY DISCRIMINATION AGAINST WATER FREIGHT, REFUSAL OF RAILWAYS AND LAKE CARRIERS TO MAKE THROUGH JOINT RATES.

1. It will be noticed that the average canal rate is found by the board to be 78c, and the average rail rate at $1.024. Therefore it is clearly seen that the losses in canal transportation by the board are due, as stated in the report of the local board, to terminal charges or charges for one extra handling of the various commodities involved in the shipment by canal which is not involved in shipment by rail and to hostility of railways to waterways, control of terminals and terminal charges by such railways. These extra charges against canal transportation and which, according to the findings of the local board make it not commercially feasible, are summarized in the report (Section 89) as follows:

"(a) Soft coal: Canal rate, 78c; unloading at St. Paul or Minneapolis, 25c; breakage in unloading, 25c; 50% transferred to another yard, at least 10c; making same delivery that railroad makes, 25c; Total $1.63. Rail rate on soft coal, 90c. Loss 73c per ton.

"(b) Hard Coal: Canal rate, 78c; unloading at St. Paul, 25c; delivery in St. Paul, 25c; Total $1.28. It will be noted that the anthracite coal is charged nothing for breakage or extra handling to another large yard. Rail rate on hard coal $1.25. Loss 3c per ton.

"(c) Iron and Steel: Canal rate 78c; unloading in St. Paul (same as coal which is more easily handled) 25c; delivery (same as for coal) 25c; Total $1.28. Storage in Duluth-Superior lost. Listed rail rate $1.40 (actual much less). Gain 12c per ton.

"(d) General Merchandise: Exactly the same throughout as Iron and Steel $1.28. (Storage in Duluth-Superior lost.) Listed rail rate $1.16. (Actual much less.) Loss 12c per ton.

"(e) Grain: Canal rate 78c; elevator charges in Twin Cities 27c per ton (¾c per bushel, average weight of grain shipped Duluth-Superior 55.6 lbs per bushel, or 36 bushels to the ton); elevator charges in Duluth-Superior (1 cent per bushel) 36c; Total $1.41 per ton. Railroad rate on grain $1.00 for 90% and 50c for 10%, or an average of 95c. Assume that one-half the wheat passing through Minneapolis would pay elevator charges even if sent forward by rail, 13.5c; average elevator charges in Duluth-Superior 36c; Total $1.445. Gain 3.5c per ton.

"(f) Flour: Canal rate, 78c; loading in Minneapolis same as on cars; transferring in Duluth-Superior (same as wheat) 33c; total $1.11. (Loss of free storage and advantage of stocking up in Duluth-Superior during winter for spring opening). Railroad rate, $1.00. Loss 11 cents per ton."

POINTS AS TO WHICH LOCAL BOARD ARE IN ERROR.

12. We respectfully suggest that the local board has perhaps unconciously been led into certain errors, due perhaps to the acceptance of statements made by railway authorities and others interested in opposing the project as follows:

(a) In finding, or perhaps assuming, that the decadence of inland waterway traffic is due to inherent or economic in-

feriority of water transportation as compared with railway transportation, and therefore that the inland canals, rivers and waterways of the United States are of no economic value in transportation and are not worthy of improvement, and hence that it is a waste of public money to continue the policy of the United States government of expending annually many millions of dollars in waterway improvements, and that such policy hould be abandoned; also in assuming that the obstacles to successful waterway transportation due to railway hostility, unrestrained, cut-throat competition methods used by railways to destroy waterway traffic and amounting in effect to a boycott of such traffic hereinafter fully described will continue in operation and either will not or cannot be removed or prevented.

(b) In finding terminal charges and costs of handling of freight to be as stated in the report and that the same will continue as found therein and cannot be reduced so as to amount to not more than three to ten cents per ton. In finding 25c per ton deterioration of coal in one handling by clam shell instead of finding that such deterioration amounts to practically nothing, being fully offset by shaking in box car from Duluth to Twin Cities.

(c) In finding the average rail rates between Lake Superior and Twin Cities as low as $1.024 per ton and especially the average rail rate on general merchandise. In assuming that existing rail rates will remain as low as at present and that railways will continue to be able to carry the rapidly increasing tonnage without congestion and consequent great public loss.

(d) In finding total bulk tonnage only 3,295,000 tons for the year 1912, and assuming that amount as the total tonnage available to the proposed canal when the true basis should be an estimate of the total tonnage available for the year 1920, or the date when the canal will be completed. This should be determined by reference to average rate of increase during the past years, shown to be at least 15% per annum.

(e) In finding the Erie Canal average freight rate at 3

mills per ton mile and in finding the average rate of proposed canal 3 mills per ton mile by comparison with rates on the old Erie at a period when it had fallen into disuse through neglect and hostile railway control, when in fact the rate on the proposed canal should be found at not to exceed 1½ mills per ton mile on bulk commodities and 2 mills per ton mile on other freight.

(f) In finding that the proposed canal will not carry coal at any saving to the consumer, when in fact coal can be transported on the proposed canal at a saving of from 45c to 85c per ton or a total saving at an average of 50c per ton on two million tons of $1,000,000.00, or more than twice $420,000.00, the amount found necessary by the local board to make the canal commercially feasible.

(g) In finding that the canal will not carry any other commodities, such as iron, steel, cement, lime, salt, sugar, grain, flour and general merchandise, when in fact such commodities can be transported via canal at an average saving of 42c per ton, or a saving upon general merchandise on 1,000,000 tons, $420,000.00; flour, 42c per ton, 1,000,000 tons, $420,000.00; north and east bound grain 42c per ton, 1,000,000 tons, $420,000.00 and a like saving upon limestone, building stone, brick, tile, commercial fertilizers, oil cake, potatoes, bran, shorts, grain, feed, hay, agricultural implements, pulp wood, etc., estimated 1,000,000 tons, at 42c per ton, $420,000.00.

(h) In finding the canal project not commercially feasible and not worthy of being undertaken by the general government.

13. We will proceed to discuss the above proposition in the order stated.

CAUSES OF DECLINE OF INLAND WATERWAY AND CANAL TRAFFIC.

The leading authorities upon waterway transportation, including the Inland Waterways Commission, National Waterways Commission, Commissioner of Corporations, reports of committees of Congress and writers upon the subject are unan-

imous in the finding that the decline of inland waterway transportation has been caused and that the growth thereof is now prevented almost wholly by unregulated, unrestrained and destructive railway competition. In the work of the destruction of waterway competition the railways have resorted to and still continue to use methods which are properly characterized as cut-throat methods of competition and destruction similar to the methods used by the Standard Oil trust in past years and which seem to all fair-minded persons as unfair and immoral. In transmitting the preliminary report of the Inland Waterways Commission to Congress, Theodore Roosevelt, then President, said:

> "The Commission finds that it was unregulated railroad competition which prevented or destroyed the development of commerce on our inland waterways. The Mississippi, our greatest natural highway, is a case in point, one time the traffic upon it was without rival in any country. **The report shows that commerce was driven from the Mississippi by the railroads.** While production was limited, the railways, with their convenient terminals, gave quicker and more satisfactory service than the waterways. **Later they prevented the restoration of river traffic by keeping down their rates along river, recouping themselves by higher charges elsewhere.** They also acquired water front and terminals to an extent which made water competition impossible. Throughout the country the railways have secured such control of canals and steamboat lines that today inland waterway transportation is largely in their hands. This was natural and doubtless inevitable under the circumstances, but it should not be allowed to continue unless under careful government regulation. Comparatively little inland freight is carried by boat which is not carried a part of its journey by rail also. As the report shows, the successful development and use of our interstate waterways will require intelligent regulation of the relations between rail and water traffic. When this is done the railways and waterways will assist instead of injuring each other. Both will benefit, but the chief benefit will accrue to the people in general through quicker and cheaper transportation.***
>
> "The commission recognizes that the cost of improv-

ing our inland waterways will be large but far less than would be required to relieve the congestion of traffic by railway extension. The benefits of such improvement will be large also and they will touch the daily life of our people at every point, uniting the interests of all the States and sections of our country."

On page 18 the Commission say:

Waterways Commission are found statements of river carriers, boats and lines and private canals owned or controlled by railroads. Most of the canals owned by the railroads are abandoned and the ownership by railroads shows why and through what influences they have been abandoned.

In the final report of the United States National Waterways Commission are found the following recommendations:

"Further legislation for protecting waterways against railway competition and for establishing more amicable relations between the two agencies of transportation."

On page 19 the Commission says:

"The lack of adequate regulations makes it possible for the railways to effectually control or to crush out water competition through their ownership and control of boat lines. It is a well known fact that the trunk line railways through their control over terminals at Buffalo and their ownership of steamship companies on the Great lakes, have been able to dominate lake and rail package freight business between New York and Chicago, and also to a considerable extent the grain traffic. On the business thus controlled the water rates have risen, while on the coal, iron and grain traffic, not controlled by the railroads, the water rates have constantly declined.*** Independent companies have been unable to compete successfully owing to the advantage which their railroad owned competitor enjoys.*** Also on some rivers the railways have acquired control of packet lines.

"While this rapidly increasing control of railways over water lines tends to bring about that harmony of cooperation between them which is necessary for the development of transfer traffic, it also has possibilities of harmful results which require regulation. Where the railways grant prorating arrangements to boat lines which they own or control, while denying the same privilege to

competing independent lines, the latter are practically precluded from securing any transfe · traffic, while on the local or port-to-port business they must meet the competition of the railway-owned boat lines, which are at liberty on this business to cut rates to any extent they choose. Under such conditions it is very difficult for independent lines to succeed, and the cases are numerous where they have been forced to retire from the field.

"The situation calls for additional legislation not only to prevent the elimination of water competition by this means but also to protect the public against the raising of water rates which railway control over boat lines makes possible. Legislation to this end is as necessary for the preservation of water transportation as is the prohibition of rate cutting and other discriminatory practices.***

"The commission believes that the simplest and most effective means of securing these desired regulations is to give the Interstate Commerce Commission greater control over water lines, and accordingly recommends that every water carrier engaged in interstate commerce which is owned and controlled by a railroad, or in which a railroad is in any way interested, and also every independent water carrier which operates over a specified route with regular schedules, be placed under the control of the Interstate Commerce Commission and be made subject to the same rules and regulations now imposed upon railway corporations in so far as they are applicable. The commission should, however, be given broad discretionary power in enforcing the requirements of the law, particularly those relating to the filing and changing of rates, so that no unnecessary burdens will be imposed upon water transportation. The commission also recommends that the Interstate Commerce Commission be empowered to establish physicial connection between the terminals of railways and boat lines where possible and desirable, and also to compel the charging of lower than the regular rates to river, lake, or sea ports when the traffic is to be exchanged with water carriers.

"If water lines were made common carriers within the meaning of the law, the Interstate Commerce Commission would have power under the present statutes, to establish through routes between rail and water lines and to require joint rates and through bills of lading. It would also have power to regulate the charges of water carriers and to require annual reports and other informa-

tion by which to judge of the reasonableness of their charges."

On page 21 we find the following:

"The above mentioned report on water terminals also shows that a large proportion of the most available water frontage is owned or controlled by railway corporations. Through this ownership or control they practically dominate the terminal situation at most of our ports, and they have generally exercised their control in a manner adverse to water traffic. In many cases they hold large tracts of undeveloped frontage which they refuse to sell or lease, and which are needed for the construction of public docks. This railway control of terminals is one of the most serious obstacles to the development of water transportation, for the control of the terminal means practically the control of the route. An independent boat line has small chance of success where it is denied the use of docks and terminal facilities or is required to pay unreasonable charges for their use. The high terminal charges at many of our ports make it impossible for small boat lines to enter at all.

"The commission believes that the proper solution of this terminal question is most vital to the future of water transportation.*** The commission emphasizes the recommendation made in its preliminary report that further improvements in rivers and harbors be not made unless sufficient assurance is given that proper wharves, terminals, and other necessary adjuncts to navigation shall be furnished by municipal or private enterprise, and that the charges for their use shall be reasonable. It cannot be too strongly urged that in many cases it is not the condition of channels so much as it is the lack of terminals that is retarding the development of water transportation.

"Where water frontage necessary for the establishment of public terminals is held undeveloped by railway or other private interests, a special act of the legislature should be passed, empowering State or municipal officials to condemn such property for public use. This plan has already been followed in a few cases and should be more widely adopted."

14. In the chapter on canals in the United States, at page 188, preliminary report Inland Waterways Commission, it will be found that through purchases of stock, lease of canals, ownership of canal boats, discriminations against independent

canal boats, discriminations against shippers using canals and other similar methods the railways were responsible for the decline of traffic upon or abandonment of most of the canals which have been abandoned or upon which traffic has declined. For instance, on page 259 it is said the principal reason why the Delaware and Raritan canal is falling into disuse is the fact that the railway company (lessee) neglects to keep the canal in repair or to make necessary improvements to accommodate it to the needs of the present day traffic, and to the further fact that it erected a number of bridges over the canal which are so low as to prevent the passage of steamers. The Commission quotes with approval an opinion that the above canal, if put in condition and properly managed, could earn a dividend of twenty-five per cent on its capital. We quote from the same page as follows:

> "The Bureau of Corporations is in possession of considerable evidence tending to show that the control of the Delaware and Raritan Canal by the Pennsylvania Railroad has been detrimental to interstate commerce."

Then follows a summary of the evidence.

The famous Morris Canal extending from the Delaware River at Phillipsburg, New Jersey, through New Jersey to the Hudson River to Jersey City, a distance of 102 miles, completed in 1836 at a total cost of six million dollars, was leased in perpetuity in 1871 to the Lehigh Valley Railway Company.

The Lehigh Canal in Pennsylvania, costing $4,455,000.00, leased to the New Jersey Central Railroad. And so practically all of the Canals in the East, except the Erie Canal, have come under railroad control or influence, including the famous Chesapeake and Ohio Canal extending from Cumberland, Maryland, to Washington, D. C.

At page 316 of this report, speaking of methods of crushing out water competition on the rivers of the south, the Commission said:

> "Moreover, it appears that in some cases the steamboat lines are controlled by the railroad interests, while in other cases there is a division of the business which

leaves the steamers only a fixed proportion of the low-grade freight.***

"In short, it appears that the railroads put in force rates so low as practically to drive the water lines out of business."

Speaking of the traffic on the Great Lakes the Commission say:

"The advantages of the lake routes are further shown by the fact that all the important trunk lines of railroads control lines of vessels operating on the Great Lakes; this railroad control of lake lines reducing the effectiveness of the water competition on most freight except ore and coal and possibly lumber."

Speaking of coastwise traffic and influence of railroads thereon, the Commission say:

"By these various water lines, freight rates on bulk commodities and also, to a large extent, on package freight, are so much below railroad rates that the rail lines can hardly be said to compete for a large part of the traffic. The influence of water competition is, however, reduced to some extent, as on the lakes, by the control of several important coastwise lines by railroad interests, either through ownership of stock or in other ways. These and other coastwise lines are members of traffic associations in which railroad interests are also represented."

Speaking of river traffic in connection with railway control, on page 330 the Commission say:

"A representative of one of the packet lines on the Ohio states that up to about 1900, when the United States Steel Corporation was formed, Pittsburg boats had prorating arrangements with practically all the railroads tapping the Mississippi River, as well as the Ohio River, and reaching the South and West. At about the time mentioned, they received verbal notices from all these railroads through their commercial representatives terminating through rates. Instead of being able to quote through rates as formerly the packet lines are now obliged to quote their own rate to the point where they connect with the railroad and then add the local tariff rate of the railroad from that point to destination. The railroads

formerly issued joint tariff sheets with the packet lines just as they do with other roads.

"The reason assigned by such roads as the Louisville and Nashville and the Queen and Crescent for the termination of joint tariff relations was the pressure brought to bear upon them by the roads out of Pittsburg.

"The loss of prorating arrangements has been a very serious matter to some of the packet lines. It has practically ruined the traffic in horseshoes, cotton ties, bar iron, wire nails, staples, etc., to the South and West, which was formerly extensive.

"A few years ago arrangements were in effect whereby shipments could be made from Pittsburg territory and prorated via river and rail to Atlanta, Ga., Chattanooga, Tenn., Birmingham, Selma and Montgomery, Ala., Richmond and Roanoke, Va., and Texas, Colorado and California points; but the community of interest under which the railroads now seem to work caused the withdrawal of the prorating arrangements at almost all points on the Ohio and Mississippi Rivers, thus compelling shippers to forward by all-rail lines instead of river and rail routes. Formerly shippers gladly availed themselves of prorating arrangements, particularly when there was a shortage of cars or congestion of freight."

Also on page 332, the following:

"Prior to the building of the division of the 'Frisco' Railway between St. Louis and Cape Girardeau, Mo., the Eagle Packet Company had prorating arrangements on much through business by way of the latter point, but since the line was completed the railroad has discontinued the prorating arrangements and the Packet Company can get no other arrangements with railroads at St. Louis.

"The prorating between Arkansas River Packet Company and the railroads was given up at the beginning of 1907. According to the packet company the railroads, after taking shipments of cotton for the East and for export would cause delivery to be delayed after they had loaded it on cars from the boat line, and would hurry their own shipments to attract business to the railroads. The boat line had to pay the same rate as other local shippers."

On pages 375-6 of that report will be found a list of water lines and private canals owned or controlled by railways.

With reference to the decline of water-borne traffic the National Waterways Commission, on page 68, say:

"The many advantages which a railway has in competition with a water route may be grouped into two general classes.

"1. Those inherent or fundamental advantages which are based upon permanent conditions.

"2. Those advantages pertaining to railways which may be deemed artificial or temporary. These are due to conditions not necessarily permanent in their nature."

Under the second head the Commission refer to the right of the railway to charge lower rates between points where their line is in competition with water routes. The power of the railways to acquire steamboat lines or enter into agreements with them for the purpose of stifling water-borne traffic, either by operating the steamboat lines or by discontinuing their use upon competitive routes. The Commission say, page 70:

"In both methods, namely, in the acquisition and operation of steamboat lines in such a manner as not to compete with railways, and in removing them entirely from the field of competition, the railway companies of the country have been very active.

"A third advantage arises from the refusal to prorate on through routes on which naturally freight would be carried part of the way by rail and part by water. In many cases the route, which apparently is the natural one, would be by water for three-fourths or more of the distance, yet the charge for the remaining railway haul is so considerable as to render carriage for the longer haul by water unprofitable.

"A fourth advantage of the railways, in this class, is the far greater attention given to provision for warehouses, terminals, and the equipment for handling freight. On many of the waterways very little if any progress has been made during the last 50 years in furnishing modern facilities for the storage or handling of traffic. In each of a considerable number of cities located upon rivers and canals in Germany the members of the commission during their recent inspection trip saw a larger investment for terminals and for the storage of freight and handling of boats than exists on the whole Mississippi River above New Orleans."

The Commission then refer to the fact that in localities where water-borne traffic has increased as on the Great Lakes careful and elaborate provision has been made for the handling of freight in the most economical manner. The reference to freight handling facilities is intended to mean facilities for handling bulk freight, such as coal, iron ore and grain. Further with reference to lake traffic, we quote from the Commission: Page 71,

> "Notwithstanding the immense traffic on these lakes, it is, however, a noticeable fact that the quantity of general merchandise or package freight has not kept pace with the far more rapidly increasing traffic in the staple articles—iron ore, coal, grain and lumber."

The reason for this will be shown later, and it is because such freight is controlled by railways who diverted it to railway lines.

On the subject of railway control of waterways, on page 515 of the final report of the National Waterways Commission, is is said:

> "The indifference of local authorities to the development and control of their terminal facilities largely nullifies the benefits that might result from the appropriations by Federal Government for channel improvements, and the control which the railways have obtained over desirable water frontage has been very detrimental to the growth of water transportation. At Buffalo, Philadelphia and other ports the railways often refuse the use of their docks to independent boat lines or allow such use only on condition that the freight unloaded on them shall be sent over their lines. Where they own boat lines, as on the Great Lakes and in the coastwise trade, their control over terminal facilities is a most important factor in eliminating the competition of independent lines."

And further, on the same subject, the commision, on page 533 say:

> "An essential factor for the success of water transportation is the existence of amicable relations between the railways and waterways. A country may possess fine rivers, well improved, and may also have a large population and an abundance of coarse, bulky commodities, re-

quiring transportation, but if the railways are allowed a free hand, they will divert most of the traffic from the waterways, even though the latter may afford cheaper transportation. In competing with waterways the railways have a distinct advantage. Only a small portion of their traffic is suited for water transportation. As a rule, little competition is possible on their passenger, express, and high-grade freight business. On the other hand, practically all the traffic of a waterway may be subject to rail competition. Furthermore, the railroad competes with water route only at comparatively few points, when the whole system is taken into consideration, while the water route is usually in competition with the railway at most all points. Under such conditions the railroad can recoup itself for losses incurred by rate cutting on a few commodities and at a few points from the profits it makes on all the traffic not affected by water competition, while the water carrier, financially much weaker and having few, if any, way stations where it enjoys a monopoly of the business, has little opportunity to recoup itself anywhere. Thus the two never compete on equal terms and the relative cost of transportation, which should be the deciding factor, ordinarily makes little difference in the outcome of the contest. In the long run if the railway forces the competition the water carrier is almost certain to succumb. Only on large bodies of water has it any chance at all.

"A railway may also greatly limit the business of a waterway by preventing the exchange of traffic between the two. This can be accomplished by charging high local rates to and from trans-shipment points and by refusing to make prorating arrangements with water carriers and to establish suitable connections with terminals. In this way the inconvenience and cost of transferring freight is greatly increased. This method of competition becomes most prominent when the railway system is fairly complete and the different roads are working in harmony. As long as a waterway acts as a feeder for a railway cooperation for the exchange of traffic will be manifest. P. 534.

"It may prove cheaper for a railway to control water carriers than to compete against them, especially when the natural advantages of the former are great. Thus it was the policy of railroads at one time to purchase outright or secure a controlling interest in competing canal companies. The common method in the United States now

is for the railways to own or control boat lines. Where they also own the terminal facilities at a port it is a very easy matter to prevent serious competition from independents. The view was once held that the waterways were free highways on which competition would always exist, but what has transpired in the United States during the last decade indicates that even water transportation may be monopolized or so effectively controlled that it is hazardous for independent boat lines to enter the field.

"The experience of all countries has been that as long as the railways were not subject to strict control, they have succeeded in crushing out or controlling water competition. The regulation of railway activities for the protection of water carriers has, accordingly, been found necessary in all countries before the normal development of water transportation could take place."

And on page 538 the Commission say:

"No serious attempt has yet been made in the United States to regulate the relations between the railways and waterways. The prevailing opinion at the time the interstate commerce act was passed in 1887 was that the waterways were the great regulators and cheapeners of railway rates, and for this reason should be hampered as little as possible by Federal regulation."

Later, on page 540, the Commission refer to the amendment to the interstate commerce act of 1910 preventing railroads which have lowered rates to compete with water routes from increasing the same until after a hearing, that is to prohibit railways from cutting rates for the purpose of driving out water competition and then raising them again, but it is said by the Commission:

"It cannot accomplish much for the reason that the common practice of railways now in competing with inland waterways is to keep their rates constantly at such a low figure that water transportation is not profitable."**

"The tendency in the United States as in England, has been to increase the power of the Government over water transportation. It was made necessary in England by the control which the railways had secured over the canal companies. In this country it has been due to the rapidly increasing control of railroads over boat lines, especially on the Great Lakes and in the coastwise trade. Where the railways and boat lines are operated under

joint tariffs, the Interstate Commerce Commission has found it practically impossible to judge of the reasonableness of such rates without having a greater knowledge of the affairs of the connecting boat lines. Accordingly, since 1887 it has recommended on numerous occasions that the law be extended to apply to common carriers by water at least to the extent of giving them power to collect statistics and demand reports."•••

"It is gradually coming to be realized in this country that the laissezfaire policy regarding water transportation is hardly more successful than when applied to other forms of business activity. The lack of proper regulation has materially aided the railways in crushing out or controlling water transportation and our rivers are no longer the cheapeners and regulators of railway rates that they once were. Even on the Great Lakes the railways have secured such control over the transportation of higher classes of freight between New York and Chicago that they have been able to raise the rates, while on traffic which they do not control the rates have continually declined. Also in the coastwise traffic the railways have secured such complete control that there is no longer any active competition. Independent companies cannot successfully compete. This situation has led to proposals for securing additional legislation. A provision which has attracted a good deal of attention is contained in the so-called Panama Bill. It makes it unlawful for any railroad company to own, lease, operate, control, or have any interest whatsoever in any common carrier by water with which it competes for traffic. A recommendation of somewhat different tenor is made by the National Waterways Commission in its final report. It proposes to extend the power of the Interstate Commerce Commission over all water carriers owned or controlled by the railways and also over all independent companies operating on regular schedules between specified points so that they may not be used in a manner prejudicial to the public good. The merits of these two propositions will be discussed in the last chapter. It may confidently be expected that in the near future legislation of some kind will be adopted."

Again, on page 555, the Commission say:

"Almost all the package freight business on the Great Lakes is carried by railway-owned steamship lines operating in connection with the railways on through rates. Some of the independent companies also prorate with the railways on a small proportion of their business.•••

"Where a boat line is owned by a railroad it is very difficult, as a rule, for independent companies to compete with it, in as much as the railway-owned boat line enjoying prorating arrangements generally has a monopoly of all the transfer traffic and is also able to compete on equal terms for the local, or port-to-port, traffic. There are many instances in the United States where independent companies not enjoying prorating arrangements with railways have been driven out of business. This has led to the proposal to clothe the Interstate Commerce Commission with greater powers over activities of water carriers, so that the advantage which a railway has by reason of its ownership of a boat line may not be used to eliminate water competition and to raise water rates."

15. As early as 1872 unfair competition by and discriminations of railways against water-borne traffic was recognized, as appears by the report of the Windom Committee on Transportation Routes, found at page 582 of the preliminary report of inland waterways commission, which recommended:

"That all railway companies and freight organizations, receiving freights in one State to be delivered in another, and whose lines touch at any river or lake port, be prohibited from charging more to or from such port than for any greater distance on the same line.***

"The uniform testimony deduced from practical results in this country, and throughout the commercial world is, that water-routes, when properly located, not only afford the cheapest and best known means of transportation for all heavy, bulky and cheap commodities, but that they are also the natural competitors, and most effective regulators of railway transportation.***

"The above facts and conclusions together with the remarkable physicial adaptation of our country for cheap and ample water-communications, point unerringly to the improvement of our great natural waterways, and their connection by canals, or by short freight railway portages under control of the Government, as the obvious and certain solution of the problem of cheap transportation.

16. The latest report dealing with the subject of railway monopoly and its control of waterway and canal traffic is the report of the committee of the House of Representatives on Merchant Marine dated March 5, 1914.

REPORT OF COMMITTEE ON MERCHANT MARINE.

The report of this committee was made after two years of thorough and exhaustive investigation covering the entire subject of water-borne traffic, foreign and domestic, together with the relation of railways thereto, including a study of the methods and results of railway competition and control. It finds in existence various combinations and consolidations practically controlling the entire field of water-borne commerce, foreign and domestic, including control of coastwise shipping, water-borne traffic on inland rivers, waterways, canals and the Great Lakes. It finds coastwise traffic is largely controlled by railways and shipping combinations; that inland water traffic on canals, rivers, waterways and the Great Lakes is almost wholly controlled and dominated by railways; that such railway control has been used for the purpose of destroying water traffic and waterway competition, including rivers, canals, waterways and in part upon the Great Lakes, all to the great loss and detriment of the public because the higher cost and rates on all waterway traffic and the constant decline of the traffic on waterways and the increased freight movements on railways at higher rates. The report is an indictment against railway methods and railway control of waterways and water transportation. The committee recommends legislation which would protect waterways from unfair, illegitimate, cutthroat railway competition and free water-borne commerce from railway control and domination, restoring to waterways their natural function of furnishing cheap transportation, especially for bulk freight. The report shows that the methods used by railways to destroy waterway competition are of the same general character formerly used by the Standard Oil monopoly to destroy its competitors and includes nearly every unfair method alleged to have been used by that monopoly.

We take the liberty of freely quoting from the findings and recommendations of the committee.

We believe the report demonstrates that the obstacles to the commercial feasibility of the proposed canal are almost wholly artificial; that they are largely the result of railroad

hostility to waterways and unfair and improper railway discrimination and competition; that such obstacles are removable and preventable by proper federal and state legislation and local action and that if the recommendations of the committee are adopted by Congress and the States and localities interested in restoring waterway traffic, the result will be a great revival of water-borne commerce in the United States such as has taken place in Europe within the past generation. When the subject is understood by Congress and the States and localities interested, we think there is no doubt whatever but that ample remedial legislation and action will follow within a reasonable time. It is not logical or fair to assume that the United States Government will permit the hundreds of millions of dollars it has invested in the matter of waterways to be wasted for the lack of proper legislation, for want of which practically the entire investment of the United States Government in such waterways is now worse than wasted.

The following quotations are from Vol. IV of the report of the committee.

METHODS BY WHICH RAILWAYS CONTROL WATERWAY COMPETITION.

"Competition in rates between domestic water lines, however, has been quite as effectively eliminated as in the foreign trade and this has been accomplished by the several lines through one or more of the numerous methods discussed in Part II of the foregoing report and summarized on pp. 409 to 412." (p. 421)

Methods of Control Summarized."

"The numerous methods of controlling competition between water carriers in the domestic trade, referred to in the preceding pages, may be grouped under three headings, viz: (1) control through the acquisition of water lines; or the ownership of accessories to the lines; (2) control through agreements or understandings; and (3) control through special practices. Briefly summarized, the various methods adopted for the control of competition are the following:

I. Control through the acquisition of water lines or

the ownership of accessories to the lines.

(1) Direct railroad ownership and operation of water lines, the railroad's marine interests not being incorporated separately (pp. 377-390).

(2) Railroad ownership through subsidiaries, or subsidiaries of subsidiaries, either rail or water (pp. 317, 318, 373-376).

(3) Control by lease, especially in the case of canals (p. 408).

(4) Ownership of boat lines by other boat lines, or by holding companies (pp. 352-353, 378-379, 383-386).

(5) Joint control of a water line by several railroads (pp. 317, 318, 386-388).

(6) Control of one water carrier over another, or of a railroad over a water line, indicated by one or more officers in common or by common representation on the board of directors (pp. 344-346, 359).

(7) Control indicated by a community of interest through influential stockholders (pp. 344-346).

(8) Railroad control of competing water lines or canals through the ownership or control of forwarding companies, thus diverting traffic to their own rail or water lines by refusing to exchange through freight with independent water lines. The latter are thus forced to depend upon local business, which is too limited to maintain the efficiency of the line (pp. 325-327).

(9) Railroad or steamship company ownership of exclusive terminal facilities (pp. 323-324, 327-328).

(10) Ownership or control of bulk carriers by producing and trading companies, which, while controlling a large portion of the traffic in a given commodity, also act as common carriers. These companies may also charter boats of independent lines, on such favorable terms as to induce such lines to observe a certain policy in the fixing and maintenance of rates (pp. 337-338, 344-345.)

II. Control through agreements or understandings:

(11) Through agreements between water lines to divide the territory or charge certain rates. Unlike the practice in the foreign trade such agreements are few in the domestic trade, the desired elimination of objectionable competition being effected through any one or more of the other methods (pp. 399-400).

(12) Through traffic associations, participated in by railroads and water lines, which publish tariffs but do not definitely bind the lines, i. e., there is no express agree-

cuts rates unduly (either by putting 'fighting ships' in the trade or by having its regular boats quote unremunerative rates) and when competition has been destroyed advances the rates even higher than they had been originally. While cutting rates the large company recoups itself out of rates at noncompetitive points or on through business secured from railroads on a favorable basis (pp. 385-386, 393-394, 407).

(20). Railroads manipulate rates so as to make differential between their all-water, all-rail, and rail-water routes ineffectual as far as water transportation is concerned. The only inducement to use the water route is economy, and if the differential between the rail and water rates is made such as to just counterbalance the disadvantages of the water route the railroads will secure the business because, all things considered, their service is preferred (pp. 328-330).

(21). Water lines make contracts with shippers whereby rebates or special rates are granted if the shipper transports his entire produce by a given line. Such contracts with important shippers greatly handicap independent lines in getting sufficient freight, especially if the contracting line spreads the report that the independent line will be allowed to remain in business only a short time. The important shippers, their business once obtained, can be held in line or disciplined (pp. 395-396).

(22). Large established water lines bring influence to bear on marine insurance underwriters whereby the independent line can secure only a less favorable rate, having due regard for the class of vessel, than its large and well-established competitors, thus forcing the independent carrier to equalize the extra cost of insurance in its rates to shippers (p. 395.)

(23). Railroads or steamship combinations can allow competing lines a certain amount of freight with the implied knowledge on the part of the competing line that the railway or steamship combination possess the power to withdraw this allotted freight if the competing line shows aggressiveness or is unwilling to conform to the line of conduct desired. Often valuable season contracts are made with independent water lines, which these lines do not wish to lose by competing for freight (pp. 342, 344-345).

(24). Railroads may divert bulk traffic from watercourses by granting special commodity rates 'in transit'

such as 'milling in transit' and 'compressing in transit' (p. 322).

(25). Railroads can give access to docks to preferred water lines with which they have special arrangements, thus forcing shippers to other water lines to pay a series of charges for switching, docking, and unloading, and putting them to much inconvenience. In effect it means that the shipper who wishes the proper service must use the water line preferred by the railroad (pp. 334-335, 399.)

(26). Railroads may refuse to issue through bills of lading except to favored lines, thus preventing independent lines from obtaining transfer traffic. To deprive an independent line of the advantage accruing from a joint rate arrangement with railroads places the line in a defenseless position as compared with competing lines not thus handicapped. Without such an arrangement the independent line can not secure interior freight and is limited largely to port-to-port traffic, which is too small in volume to support the line. On the other hand, the water line having the prorating arrangement can cut rates to an unremunerative basis on the port-to-port traffic, thereby eliminating its less fortunate competitor, and recoup its losses in large measure out of the profits secured on the through business (pp. 349-350, 354-356, 400-401).

(27). Railroads charge more for the local haul from Buffalo to seaboard points, for example, on grain that is taken to Buffalo by boat than the proportionate share of the all-rail haul from Chicago to the seaboard, thus making the through rail-water route unprofitable as compared with the all-rail route. The local rate for the eastern rail haul is so high as to leave little to the independent water carrier for its local lake haul (pp.321-323).

(28). Railroads can greatly reduce rates between these points only where they are competing with an independent water carrier. Since most of the traffic of a large railroad system is free from water competition, it can afford to lower the rates on the competitive traffic to an unremunerative basis without appreciably affecting the earnings of the entire system. (p. 407)."

We quote from the findings as to specific instances of railway control of waterways and practices by which such control has been effected. Page 317.

"Control of the Through-Package Freight Business Railroad-Owned Boat Lines.

Enumeration of railroad-owned steamship lines. Although numerous independent steamship lines operate in the local port-to-port traffic on the Great Lakes, the through traffic from the western gateways on the Lakes, such as from Chicago and Duluth, to the eastern seaports via Buffalo, is controlled exclusively by six boat lines owned by the trunk line railroads connecting the east and central west."

The report then enumerates the various lines of railway and gives by name and tonnage, etc., the boat lines controlled. On page 319 we quote:

"Methods by which railroads owning standard lake lines, have prevented independent water carriers from participating in the through package freight traffic. Up to the time that the trunk railroad lines reached only to Buffalo, and had no interest in rail lines to the west of Buffalo, it was to their interest to maintain the Lake lines in such a manner as to attract the largest amount of tonnage to Buffalo. But, with the extension of their rail lines to the west, their policy changed; and instead of attracting all possible tonnage to the Lake lines connecting Buffalo and the west, every effort was made to divert water-borne traffic to their rail lines and to prevent independent water carriers from securing an important foothold."***

"So long as this class of freight originates on the railroads and is controlled by them, it is in their power to say to whom they will give it. They will not share it with any individual carrier that might offer, and they have thus controlled its movements. (Vol. 2. p. 842).*** Only boats owned by the railroads may engage in the package freight business between Chicago and Buffalo. If these two cities were both destination points for traffic, of course non-railroad owned vessels could not be excluded from competition. But Buffalo is not a destination point. It is a transfer station. Goods reaching Buffalo by Lake must go east by rail or canal. Likewise, freight from the east reaching Chicago water-borne must be brought to Buffalo by rail or canal. The railroad makes with its own boat lines a through route and a joint rate from Chicago to the eastern destination, or vice versa. (Rep[illegible] of the Chicago Harbor Commission, 1909, p. 187).

In fact, all the testimony before the Committee is to the effect that the through transportation of strictly package freight on the Lakes is completely under the control of the railroad-owned lines." (p. 320).

"Having become masters of the water-borne package freight business between Chicago or Duluth and Buffalo for trans-shipment to the seaboard, the railroads began the attempt in 1908 to secure control of the large grain movement to the east via the Lakes, a traffic handled largely by tramp steamers which seek to make their rates from port-to-port without reference to rail transportation. The policy of the railroads in this respect is to charge more for the local haul from Buffalo to the seaboard on grain that is taken to Buffalo by boat, than the proportionate share of the all-rail haul from Chicago to the seaboard. The effect of this policy is two-fold, viz., (1) to divert the movement of grain from the Lakes to the railroads, and (2) to make the local rate between Buffalo and the eastern destination so high as to leave little to the independent water carrier for its local lake haul after paying the rate for the local rail haul." (p. 320.)

On page 324 we quote:

"Railroad control of the Erie Canal. In view of the railroad control of the standard through Lake lines, as well as the lake haul eastward of Buffalo, it may be asked: Cannot independent Lake carriers utilize the Erie Canal route for shipments from the West to the seaboard? The answer is that this route is also completely dominated by the railroads as far as through traffic is concerned. Although at one time this water way served as an important connecting link between the West and the East and exerted a powerful influence on rail rates, the railroads as early as 1878 sought to control this traffic, and since that time have lost no opportunity of diverting the canal traffic to their own lines by one method or another. Their control of the Erie canal has become so effective that the carriage of through freight on the canal, i. e., freight originating outside of the State of New York, has, according to the findings of the New York Barge Canal Terminal Commission, 'almost reached the vanishing point'. Thus, during the year 1910, which is representative of recent years, the shipments of both through and way freight on the State canals of New York totaled only 3,473,412 tons, and of this only 805,180 tons represented through freight. In other words, the way freight, i. e., freight to or from

points on the canals, was 3.31 times the through freight, thus showing that the Erie Canal has become relatively unimportant as a route for the carying of freight between the Great Lakes and the Atlantic Seaboard. (Report of the New York Barge Canal Terminal Commission, 1911, Vol. I, pp. 63-64.)

"This declining importance of the canal is largely due, as already pointed out, to the efforts of the railroads to divert the traffic to their own lines, and the following factors may be briefly mentioned as indicating the methods which the railroads have pursued in accomplishing this purpose."

Here follows an enumeration of the railways which acquired various canal lines on the Erie and an explanation that the canal lines controlled by the railways are really railroad forwarding agencies which own no boats but solicit freight from shippers and charter canal boats from individual owners.

On page 326 we quote:

"The railroad forwarding agencies, enumerated above, together with a few independent canal lines, are members of the New York Canal Forwarders' Association. According to the report of the Commissioner of Corporations, the railroad agencies have also effected an association of their own known as the New York Canal and Lake Agents' Association, and this organization together with the Association of Lake Lines (also dominated by the railroads) arranges and publishes the through rates via the canal as well as joint canal and lake rates."

"Having acquired all the through lake lines connecting Chicago and Duluth with Buffalo, and controlling the leading forwarding agencies on the canal, it was comparatively easy for the railroads to divert the canal traffic to their own rail or lake lines by refusing to exchange freight with independent canal lines or forwarders, except upon the payment of full local rates from Buffalo. As pointed out by the Commissioner of Corporations (Report of Dec. 23, 1912, p. 59), 'the canal rate to Buffalo plus the rail rate, or the local lake rate, from Buffalo to the west makes the through rate so high as compared with the through rate of railroads, by their canal-lake-and-rail lines to western points, that the independent forwarding agencies virtually have no chance to do business'. In other words, the independent canal lines were prevented from

having any lake connections, and were thus forced to depend upon local canal business, which was relatively small. Relative to this practice the New York Barge Canal Terminal Commission reports that, (p. 327)

'Canal boats are greatly handicapped because of the lack of the through bills of lading so invariably used by the railroads and which, of themselves, so greatly facilitate shipments by the railroads.*** Again, the railroads have always refused to either prorate or through rate with canal carriers but, on the contrary, have only been willing to receive freight brought to them by canal boat in the most unusual and expensive manner, such as by forcing them to discharge their freight at places other than the railroad wharves, and then team it to the railroad wharves, instead of allowing them to come direct to the railroad wharves and there discharge their freight. By refusing, on the other hand, to deliver freight to canal boats at their wharves, they have been able to prevent them from carrying large quantities of freight that would otherwise have been shipped by the canals. (Report of 1911, p. 78.)

"In connection with the foregoing factors should be mentioned the railroads' policy of acquiring the terminal facilities at both Buffalo and New York, thus forcing the independent canal lines to even abandon most of their local business. The effect of this railroad control of terminal facilities is explained at great length in the 1911 report of the New York Barge Canal Terminal Commission and is regarded by the Commission as the greatest obstacle confronting transportation on the Erie Canal. Thus as regards Buffalo, with reference principally to the eastbound trade, and especially grain which is the chief item of eastbound through traffic, the report states:

'The package freight business is wholly in the hands of the railroads, chiefly because of their terminal facilities, and because the canals have, hitherto, possessed no terminal facilities whatever. Until facilities of an entirely independent character are established at Buffalo for transshipments, it is unlikely that there will be any considerable increase in through freight traffic upon the canals, however they may be enlarged short of avoiding the breaking of bulk at that city.*** In the case of grain, there are but three or four 'independent' grain elevators. There being no wharves or other facilities at Buffalo reserved for the use of vessels bringing cargoes there from

Lake ports that might be carried on the canals, these boats are practically forced to lie up at privately-owned generally railroad-owned wharves, thus facilitating the shipment of the freight by the railroads, since the latter refuse to afford any accommodation at their wharves for canal boats attempting to obtain cargoes for eastern carriage, as well as denying to all canal boats other than those chartered by them access to their wharves for the shipment of freight brought west.' (Report, 1911, pp. 77-78.)

"Again with reference to New York City report states:

'There has never been any section of the improved water front in New York City, not even at the so-called canal basins, or canal districts, where there were any facilities, other than the unshedded wharves, for the accommodation of freight destined for shipment over the canals, or for freight received from the canals. There has, even at such open wharves, been no one to receive and care for any freight that might be received either for shipment over the canals, or that might be received at them by canal boats for local use. Lacking these essentials to the modern handling and carriage of freight it was inevitable that the through business should have almost vanished. (Report of 1911, p. 77)'.

"THE EFFECTS OF RAILROAD CONTROL OF THROUGH LAKE LINES AND CANAL FORWARDING AGENCIES.

"Aside from the elimination of independent carriers the effects of such control which have been most emphasized by witnesses before the committee are the increase in water rates on through package freight and the failure to improve the service. In the first place lake-and-rail and canal-and-lake rates have shown a marked advance under railroad control, while the all-rail rates between Chicago and New York have remained about constant for the past two decades. Because of the slower speed and the larger number of transfers incident to water transportation, the lake-and-rail rates between Chicago and New York, for example, are lower than the all-rail rates between these points by an established difference, i. e., a differential which measures approximately the difference between the value of the water service and the rail service. The present differentials between the two services

may be illustrated for the several classes of freight as follows:

"Westbound:

	Class 1.	Class 2.	Class 3.	Class 4.	Class 5.	Class 6.
New York to Chicago:						
All-rail	75	65	50	35	30	25
Rail-and-lake	62	54	41	30	25	21
Differential	13	11	9	5	5	4

Eastbound:

	Class 1.	Class 2.	Class 3.	Class 4.	Class 5.	Class 6.
Chicago to New York:						
All-rail	75	65	50	35	30	25
Rail-and-lake	63	55	43	30	26	21
Differential	12	10	7	5	4	4

"The above differentials are merely illustrative of the plan in general; various differentials have been adopted as between different routes and different cities. But what should be particularly noted is that the differentials between the all-rail and the lake-and-rail rates have in all cases been narrowed, thus causing an increase solely in the rates for the lake haul, since the all-rail rates have remained constant. While the standard lake-and-rail rates between New York and Chicago, for example, were—

Class 1.	Class 2.	Class 3.	Class 4.	Class 5.	Class 6.
54	47	37	27	23	20

prior to 1901, these were increased in 1901 from 54 to 59 cents on first-class freight, and other classes to correspond. In 1907 there was another advance to 62 cents on first-class freight, and other classes to correspond. Similarly canal-and-lake rates from New York to Chicago have also advanced since 1892, as follows:

	Class 1.	Class 2.	Class 3.	Class 4.	Class 5.	Class 6.
In 1892	30	25	20	18	16	14
At present	42	36	29	23	21	18

"These increases in the through water rates, while the all-rail rates have remained nominally constant, have, it was argued by the witnesses before the Committee, made the differential between the lake-and-rail and all-rail rates so small that the freight will move by rail. The inducement to use the water route, it is argued, is economy; and if the differential between the two rates just measures the disadvantages of the water route, the railroads will get the business, because, all things considered, the railroad service is preferred. Under such conditions, it is argued,

the value of the water line as a regulator of rail rates disappears. Mr. William M. Hopkins in his testimony emphasized the point that the reduction of the difference between the all-rail and the lake-and-rail first-class rate between 1901 and 1913 from 21 to 13 cents, and correspondingly on other classes, has been brought about, not by a reduction of the all-rail rate, but by an advance wholly on the lake transportation portion of the through rate. (Vol. 2, p. 1225)

"Mr. Julius H. Barnes of Duluth emphasized the same point in his testimony, stating that whereas 'in 1890 the lake-and-rail rate on flour from Minneapolis to New York was 20 cents and the rail rate 25 cents, and all flour moved lake-and-rail, they have since advanced the lake rate until the difference today is between 23 and 25, instead of 20 and 25, and that is just the dividing line where they are giving just enough to the Lakes to make a bluff at water transportation. It it was necessary, they would raise it to 24 as against 25, and they can do that, in my judgment.' (Vol. 2, p. 843.)

"To the foregoing it may be added, as already indicated, that the Lake lines have arrangements for through routing and division of rates with the railroad lines, as shown in tariffs filed with the Interstate Commerce Commission, and the division received by the railroads for their haul east of Buffalo on traffic moving via the lake-and-rail route are substantially the same as the divisions they receive for the same haul on similar traffic moving via all-rail routes.

"Not only has freight destined to the East been diverted from the Lakes through the narrowing of the differential between the lake-and-rail and all-rail rates, but the railroads have had no incentive to improve their water-line service, their policy in this respect being entirely different from that pursued by the bulk carriers. Mr. Barnes testified that

'Package freight lines are loading and unloading merchandise on the Lakes the same today as they did 40 years ago. Absolutely nothing has been done in the way of installing mechanical devices to cheapen the transshipping of package freight. It has been to the interest of the railroads to maintain the old-fashioned gangway style of steamers, in which freight must be taken on and off over the side of the boat on trucks. The small derrick arranged for some classes of freight, such as flour and

mill stuffs, which would lift the freight directly from the cargo hold out on the docks, would cheapen the transshipping charge, but as long as it originates on the railroads and is controlled by them, it is in their power to say to whom they will give it and they will not share it with any individual carrier that might offer. (Vol. 2, pp. 841-842)' "

On page 336 we quote:

The situation as outlined for the movement of package freight does not apply in the case of bulk products such as grain, iron ore, and coal, except that in the case of grain the rail carriers, as already pointed out, do exercise a large measure of control over the rates of water transportation by reason of their control of the terminal facilities and the connecting rail transportation beyond the Lakes. In the main this bulk freight is handled by so-called independent tramp steamers whose port-to-port rates are fixed without reference to rail transportation. As a result conditions in this field have shown a tendency decidedly favorable to the utilization of America's leading waterway as a chief means of transportation; in fact the entire development in the bulk traffic has been the exact opposite of the tendencies noted in connection with the movement of package freight by railroad-owned boat lines. This class of freight traffic has had the advantage not only of an improved type of steamer of large carrying capacity, but improved machinery has been installed at both ends of the trip for the expeditious handling of iron ore and coal at a cost of only a few cents a ton (Vol. 2, p. 844), thus greatly reducing the cost of loading and unloading and saving the boats much time."

On page 337 we quote:

"Despite the favorable tendencies noted in the preceding section, it should be stated that there has been a marked tendency during recent years toward consolidations among bulk carriers transporting ore and grain eastbound, and coal westbound on the Lakes. The 8 largest of these consolidations deserve special mention, and the essential facts with reference to each, as reported to the Committee by the managements of the companies involved are herewith presented."

On pages 403-404-405 is given a summary of the railway control and ownership of the coastwise and Great Lakes shipping, and on page 406 we quote with reference to the

situation on inland rivers, bays and canals:

"Much the same situation as was noted in the coastwise and Great Lakes trade also exists on inland rivers, bays and canals. Despite the continued improvement of waterways and the great increase of traffic in the coastwise and Great Lakes trade, 'the total river traffic of the country has steadily decreased both proportionately and absolutely, with the result that few rivers are used to anything approaching their full capacity.' While, generally speaking, the decline of navigation lines on inland waterways is largely traceable to the natural extension and legitimate competition of the railroads, there is ample evidence to show that the railroads have successfully opposed the maintenance and development of river and canal traffic by a variety of effective methods, mainly by acquiring competitive water lines and canals, by obtaining control of the terminal facilities, by the use of rebates, or by the undercutting of rates. Aside from the acquisition of competing lines, the undercutting of rates seems to have been the favorite method adopted by railroads to eliminate water competitors. Since the railroads reach all sections of the interior, and the inland navigation lines are restricted to their water course, they can easily control so large a proportion of the total freight as to leave the water lines insufficient freight to maintain proper terminals and an efficient service. As reported by the Inland Waterways Commission:

'So large a portion of railway traffic is free from water competition that railways can readily afford to so reduce rates on those portions affected by such competition as to destroy the profits of the water lines without appreciably affecting the profits of the rail systems, which recoup these reductions by higher rates elsewhere. This has been the case with most of the great inland waterways, excepting the Great Lakes where the conditions of water and traffic approach those of the open sea.'

"This method of eliminating water competition is well illustrated by the experience of water lines on the Mississippi River system. On this system packet line services have largely disappeared, owing to railroad competition, and the few lines remaining while generally independent of railroad control, are but weak competitors. Effective railroad opposition to independent water lines also exists on the Nation's other leading rivers, such as the Columbia and Hudson.

"Most of the canals of the country have also long since passed into the hands of competing railroads. Almost invariably, following the acquisition of the canals, the railroads failed to maintain the efficiency of the same for transportation purposes or raised the tolls so high as to preclude their use, or entirely abandoned the property. In some instances, however, the decrease or practical disappearance of canal traffic is traceable to the antiquated character of the canal, and in all likelihood most of the privately owned canals would by this time have ceased to be an efficient means of transportation, even though they had not been acquired or controlled by the railroads. Even the most important State canal—the Erie Canal—as already shown, is so completely dominated by the railroads, as far as through traffic is concerned, that the movement of freight originating outside of the State of New York via this route has almost reached the vanishing point. Not only do the railroads own all the through Lake freight lines centering at Buffalo, but they control practically all the terminal facilities at both ends of the canal as well as the forwarding agencies and boat owners. At present about 90 per cent of the mileage of the private canals still in operation is under railroad control."

RECOMMENDATIONS OF THE COMMITTEE.

The committee, after referring to the extent to which waterway competition has been eliminated, p. 415, say:

"The Act of August 24, 1912, providing for the opening, maintenance, protection and operation of the Panama Canal, contains provisions extending the jurisdiction of the Interstate Commerce Commission over the interstate transportation which involves the carriage of property by rail and water, in the following particulars, viz: (1) to establish physical connection, where this is reasonably practicable and justifiable, between the rail carrier and the dock of the water carrier by directing either or both of the carriers to construct the connecting tracks; (2) 'to establish through routes and maximum joint rates over such rail and water lines, and to determine all the terms and conditions under which such lines shall be operated in the handling of the traffic embraced; and (3) 'to establish maximum proportional rates by rail to and from the ports to which the traffic is brought, or from which it is taken by the water carrier, and to determine

what traffic and in connection with what vessels and upon what terms and conditions such rates will apply.' Section 11 of the Act also provides for the divorcing of common carriers by water from the railroads under certain conditions. These legislative requirements go far toward eliminating some of the undesirable practices which were found by the Committee to exist in the domestic commerce of the United States. The Committee, however, believe in view of the facts presented in Part II of the report, that additional legislation is required, and wishes to offer the following recommendations:

"(1) That the jurisdiction of the Interstate Commerce Commission be extended to the interstate port-to-port traffic of domestic water carriers, with full power to require all such carriers to file their port-to-port rates and to submit reports of their financial and business operations. As regards interstate port-to-port traffic the Commission should be given full power to regulate rates and to determine maximum charges.

"(2) That water carriers be required to file for approval with the Interstate Commerce Commission all agreements affecting interstate transportation, whether written or oral, and all modifications or cancellations thereof, with other water carriers, with railroads or other transportation agencies, or with shippers.

"(3) That the carriers be prohibited from granting rebates of any kind to shippers and from discriminating between shippers in rates, in the giving of space accommodations and other facilities, and in the making of unfair contracts based on the volume of freight offered. Water carriers should also be prohibited from using fighting ships, or deferred rebates, or from threatening or resorting to retaliatory or other unfair measures against shippers or competitors. The Interstate Commerce Commission should be empowered to adopt whatever measures it may consider necessary to protect shippers or competitors against such retaliatory methods. Water carriers, if cutting rates with a view to driving out a competitor, should be denied the privilege of restoring rates; and jurisdiction should be conferred on the Interstate Commerce Commission to determine whether rates were cut with the object of crushing such competitor.

"(4) That the Interstate Commerce Commission be empowered to investigate fully all complaints charging unfairness in the settlement of claims, and indifference to

the loading and landing of freight in proper condition; and to adopt all necessary rules and regulations for the adjustment and settlement of claims.

"(5) That as regards all matters relating to Interstate transportation, all traffic associations or conferences, whether pertaining to through rail-and-water transportation or to port-to-port traffic only, be brought under the supervision of the Interstate Commerce Commission. The Committee recommends that the conditions under which an outside water carrier is admitted to such associations or conferences should be approved by the Commission, and that an outside line should not be denied membership for unfair reasons or simply because the unanimous consent of existing members of the association or conference to the admission of said line cannot be obtained.

"(6) That the railroads be prohibited from making the through rail-and-water route unprofitable as compared with the all-rail route by charging more for the same service on water borne commodities than they charge for the proportionate share of the all-rail haul.

"(7) That the Interstate Commerce Commission be empowered to compel railroads to allow competitive water carriers to apply effective differentials. The Commission should also have full supervisory power over divisions between railroads and water carriers as regards through rail-and-water rates. The Committee recommends that rate divisions on any trade route should be opened equally to all water carriers that comply with such conditions of quality and regularity of service as the Commission may determine to be reasonable.

"(8) That the railroads and water carriers be required to issue through bills of lading to all interstate water carriers that meet such conditions of quality and regularity of service as the Interstate Commerce Commission may consider reasonable.

"(9) That railroads be required to account separately to the Interstate Commerce Commission for the income and expenditures of interstate water lines owned or controlled by them.

"(10) That railroads be required to make their terminal facilities available to water carriers on equal terms and under such reasonable conditions as the Interstate Commerce Commission may prescribe. The Committee also believes that the Federal Government should pursue a policy of not expending money in the interests of

any port for harbor or channel improvements, unless that port has efficient dock facilities available to all water carriers.

"(11) That there should be legislation providing for equal treatment to all shippers and water carriers by transfer and lighterage concerns when forming a link in interstate or foreign commerce.

"(12) That all interstate traffic on canals be placed under the supervision of the Interstate Commerce Commission; and that the railroads be prohibited in the future from acquiring, either directly or indirectly, ownership and control of or interest in canals, or water lines, forwarding companies and other navigation facilities on such canals, when the same are used in interstate transportation."

18. From the foregoing it seems to be perfectly clear that the railroads have succeeded to a very large extent in monopolizing transportation not only upon the railways but upon the waterways and canals to such an extent that they control through freight rates by water, leaving to independent carriers only that small fraction of the entire traffic to be had in port-to-port traffic even as to which the independent water carrier is entirely at the mercy of its railway controlled competitor who has the great advantage of traffic with railways, prorating arrangements, etc., on the profit of which the railway controlled carrier can exist and carry port-to-port traffic at any rates fixed by the railway controlled water carrier. The control of terminals, warehouses, docks, loading and unloading facilities, etc., enables the railway combination, owning and controlling railway terminals and lake and water carriers to offer advantages in the way of free storage, or rates which include or absorb terminal and handling charges and transfers from rail to boat and boat to rail at such a decided advantage that under present conditions the independent canal boat or water carrier cannot exist except at the pleasure of the railway combination or monopoly. The question is: Must it be assumed that the foregoing conditions are uncontrollable and that such conditions are to indefinitely continue? Should it not be assumed that the evils of unrestrained railway competition resulting in monopoly of transportation by water and rail and

enormous losses annually to the consuming public can and will be reached by legislation and by other orderly and legal methods?

Must it not be assumed that public opinion aroused by the several reports of congressional bodies and other authority upon the subject will in thundrous tone voice a demand which will be so powerful as to result in the needed legislation being promptly enacted?

19. So far as local legislation is concerned, with reference to placing ownership and control of terminals in the public authorities of the States of Minnesota and Wisconsin, and providing for the use of the proposed canal adequate terminals equipped with the most modern terminal facilities, we have no hesitation in pledging that the same would be provided by the localities interested in the promotion of this enterprise and if upon a review of the report of the local board the existence of hostile railway control or want of adequate teminals and terminal facilities without discrimination were deemed to be material to the success of the canal the proponents of the canal would welcome the conditional approval of the general board, i. e. conditioned upon the removal of the adverse conditions found to exist with reference to hostile railway monopoly and absence of terminals and terminal facilities.

HISTORY OF HOSTILE RAILWAY COMPETITION.

The local board of engineers make the claim that current history shows that unless there is sufficient tonnage available to be transported by the canal at the present time such tonnage will not increase but on the contrary will decrease. It is partly in this connection that the local board cites the decline of traffic on the Ohio River, Mississippi River, Erie Canal, etc.

We are glad to invoke the authority of history with reference to the causes of the decline in the water-borne traffic in the United States. The history of waterway transportation is much the same whether we examine the history of waterways in Europe or in the United States. We believe a study

of the history of waterway transportation in Europe and in America will convince the unbiased reader that the history of waterways in Europe is now being duplicated in the United States; that the rise and decline of waterway transportation in the United States was caused by identically the same factors which caused the former decline of waterways in Europe. We think the same causes that contributed to the resurrection and rehabilitation of waterways in Europe are now at work in America and will cause a like development of waterway traffic in the United States, and that there is now commencing in the United States a great revival of waterway transportation similar to that which is so plainly in evidence in Europe.

Authorities on the history of inland water transportation divide its history into three periods: (See p. 471 et. seq. Final Rep. N. W. C.)

First. The period which began with the sixteenth century in Europe and shortly after the close of the Revolutionary War in America, and extended to the time of commencement of railroad building.

Second. The period of active competition with railroads resulting in decline and decadence of waterways; and

Third. The period which began in France, Germany and Belgium as early as 1870 and which is characterized by the great revival of water transportation.

The first period was essentially one of canal building and commenced in Europe in the seventeenth century. Practically all of the canals of France, Holland and Belgium were completed before the year 1800.

In England active canal building began with the opening of the Bridgewater canal in 1761. This enterprise was a great success and created a boom for canal construction. By the year 1800 practically the whole of the English canal system aggregating more than a thousand miles, was completed. A few additions were made between 1800 and 1830, but since 1830 no important canals have been constructed except the Manchester canal.

Canal building in the United States began a short time af-

ter the close of the Revolutionary War. Washington was one of the pioneers in the movement. The most rapid construction commenced about 1825 when the Erie Canal was completed. It was a great success and aroused great enthusiasm for canal building. Most of the canals of New York, Ohio, Pennsylvania, New Jersey and other eastern states were completed before 1850.

Canals constructed in Europe during the first period were usually of small capacity. The majority of English canals had a depth of only three and one-half feet, thirty-five per cent of the total canal mileage of England would only accommodate boats carrying from eighteen to thirty tons, fifty-eight per cent of boats carrying from forty to sixty tons and only seven per cent would accommodate boats of greater capacity.

The early canals in the United States were also shallow draught and equipped with numerous locks and sometimes incline planes. The Morris Canal was originally only four feet in depth and accommodated boats of less than forty tons capacity.

Although the canals of the first period as a rule were scarcely more than ditches many of them were very profitable enterprises. Until railroad competition began they furnished the principal means of transportation and played a very important role in the prosperity and development of different countries. They appear to have been more profitable in England than elsewhere, their profits being greater than those of the railways have ever been. Many of the canals in the United States were exceedingly profitable. The Schuylkill navigation during the period of 1829-42 paid dividends ranging from 9% to 24%. The Erie Canal, up to and including 1882 had returned to the State of New York $42,599,718 profits on an investment of $49,591,853. Other eastern canals were highly profitable.

The period of railroad building commenced about 1830. Within ten years in Europe competition between railways and waterways became severe. This continued for the next thirty or forty years, at the end of which time the waterways were

generally left in a decadent condition. At first the railroads often intersected the waterways and served as feeders. As soon as parallel lines were built active competition began. Passenger traffic was the first to drop off, then higher grade freight, and finally, when the railroads had consolidated sufficiently to form through routes so as to serve a large territory in addition to that adjacent to the banks of the canal, they offered cheaper rates and secured most of the coarse, bulky traffic carried by the waterways. One great weakness of the canal system was that they were owned and controlled by various private companies in short sections and they failed to amalgamate or consolidate so as to unite their strength and furnish facilities for through traffic. The railways uniformly adopted the policy of consolidation and amalgamation, thus extending their territory and ability to handle through traffic, at the same time gaining the advantage naturally accruing to large combinations.

In England, when the shareholders of canals saw their profits dwindling, they procured the consent of parliament for the purchase of various canals by the railways and within five years after active competition commenced, about 1845, one-third of the total canal mileage fell into the hands of the railway companies. Part of the canals so acquired were used as road beds for new railway lines or abandoned; others were used for feeders, and almost all of the traffic declined rapidly as the result of railroad control or competition.

Railway competition in the United States commenced in 1842 between the Reading railroad and the Schuylkill navigation. It was severe until 1849 when the railroad and canal entered into an agreement as to charges, and in 1879 the canal was leased to the railroad for 999 years. The history of the Schuylkill navigation was repeated with the Lehigh canal which was sold to the Lehigh Valley railroad, and in a few years practically all of the private canal companies in New York, Pennsylvania and New Jersey passed into the hands of their railway competitors. New York and Ohio retain their publicly owned canals. As we have heretofore seen, the

leasing or selling of a canal to a railroad meant its practical and ultimate abandonment.

In the Mississippi Valley and the south severe competition between railways and waterways did not begin until after the Civil War, when the short railway lines were amalgamated into through routes. The improvement of rivers by federal government enabled waterways to compete successfully for a time, but the commerce of the Mississippi River reached its maximum from 1880 to 1884, since which time there has been a considerable decline. Some of the western rivers have not experienced railway competition and their traffic has steadily increased. Wherever railway competition has been encountered almost without exception a marked decline in river and canal commerce has ensued. In Europe, including England, interest began to be aroused in water transportation in the sixties and seventies. This was due to the same causes now operating in this country, viz, a growing hostility towards railroads brought about by discriminations, high rates, lack of service and congestion of traffic. The result of the agitation in Europe has been a practical nationalization of waterways in France, Germany, Belgium and Holland, which countries have acquired practically all of the canals and waterways. The first step in the revival of water transportation in Europe was the standardization of canals and waterways as to depth, locks, etc. The old methods of towage by mule or other power being supplanted by steamers or electric tractors. Terminals were built and equipped with the latest appliances and better types of boats and barges are being used.

Growth of water transportation in Germany, France and Belgium during the last forty years has been phenomenal; from 1875 to 1909 traffic on the German waterways increased 433 per cent; from 1880 to 1909 traffic on the French waterways increased over 90 per cent; and in Belgium, during the years 1890-1907 the traffic on inland waterways increased 115 per cent. The following table shows the growth of traffic in these three countries:

Year.	Germany. tons	France. tons	Belgium. tons
1875	13,600,000		
1880		18,000,000	
1890		24,167,000	25,242,000
1895	30,000,000	27,174,000	30,142,000
1900	46,600,000	32,446,000	38,178,000
1905	67,000,000	34,020,000	53,345,000
1907		34,702,000	54,164,000
1909	73,357,000	35,624,000	

Russia reports 100% increase in the last ten years.

In Germany, at several of the largest inland cities, the receipts and shipments by water nearly equal those by rail. Since 1885 the waterways centering at Berlin carried from forty to fifty per cent of the total receipts and shipments; at Hamburg the receipts by river are nearly equal to those by rail.

England is the only one of the more advanced European countries in which inland waterway transportation is still in a backward condition. The canals there were originally built by private interests and are still under private control. The different canals still remain disconnected and under a multiplicity of authority split up into short sections owned by different companies or persons. Very few waterways have been enlarged or improved to meet modern conditions; almost all through routes are blocked by railroad control by one or more important links. Not one of the nineteen different through routes in England and Wales is controlled by a single body. On three routes connecting London and Liverpool there are twenty-six different authorities. On the four routes between London and Bristol there are twenty-seven different authorities. On the route between Holland-Bristol the boat must traverse ten different routes with gauges varying from 50x14x 4.6 feet to 212x22x9.6 feet. Since 1870 there has been a gradual revival of interest in waterways in England which has led to considerable agitation, parliamentary inquiries and some legislation, having for its purpose the protection of canals and waterways from unreasonable, unrestrained and unfair competition, ownership and control, but up to the present time, owing to the opposition of railways in England, there have

been no considerable results in the revival of water transportation.

The history of waterways in the United States is a duplication of continential European history of the same subject up to the year 1870. Canal and waterway transportation in Europe were destroyed by railway interests by practically the same means employed here, as shown in the foregoing reports, and with the same results. Waterway transportation in Europe was revived by government protection of waterways from the hostility and competition of railways. It will be necessary to employ the same means in the United States to bring about the same result shown to have followed from the governmental policy in Europe. There has been a growing agitation for improvement of waterways in the United States for twelve or fifteen years past. This has been especially prominent since the congestion of traffic which occurred in 1906-7, when the railway failed to furnish sufficient accommodations to take care of the enormous traffic. The agitation in this country, as in Europe, is based upon the fundamental and economic necessity of cheaper and more adequate transportaion facilities. The United States posses es better natural waterways than any country in the world and it is evident that natural conditions have not been responsible for the decline of water borne traffic in this country. It is conceded and is apparent from the reports hereinbefore cited that railway competition has been more severe here than in any of the countries of Europe. The methods used by railways to strangle waterways have been and are more vicious and crippling in character than any known in the history of continental Europe. So far as any argument with reference to the future of waterways in the United States can be based upon the history of waterways in general, it would seem to be almost conclusively apparent that the waterways of the United States, if freed from the artificial conditions created and fostered by hostile railway interests and adequately protected by the government from destructive railway competition, would be revived and restored and would carry a large percentage of the bulky freight of this country naturally tributary to such waterways. If proper protective

conditions were supplied by governmental action and legislation, supplemented by proper terminal facilities, physicial connection between railway and waterway, etc., no reason can be advanced why the waterways of the United States should not compare very favorably in increase of traffic with the waterways of Europe.

It appears from the history of European waterways that Germany has the best and most efficient waterway system of any known in the world. This is shown by the great increase of traffic during the last forty years, which period marks the industrial rise of Germany from a comparatively insignificant nation commercially to the foremost place among the nations of the world. She is now England's greatest European rival for commercial supremacy. It appears that freight can be transported from the interior of Germany and landed on the dock at London as cheap as the same freight can be transported from points inland in England distant fifty miles from London. (F. R. N. W. Com. P. 490.) Leading economists and authorities on commerce, attribute Germany's rapid commercial advancement to her magnificent system of inland waterways, while England's comparative commercial decadence is likewise attributed to the utter failure of her inland waterway system. It is well known that railway rates in England are higher than in any other country in the world. The average capitalization of her railway lines is also the highest of any in the world, being an average of $275,000.00 per mile.

While it may be claimed that conditions in Europe are more favorable to waterway transportation than in the United States on account of the greater density of population and the enormous quantity of bulk commodities such as coal, iron ore, grain, cement, etc., available there, yet the great success of revived waterway transportation in Europe is material to this discussion because such history clearly shows the necessity of the protection of waterway transportation even under the most favorable conditions from unrestrained, unregulated railway competition and because it is further shown that the conditions necessary to the favorable development of water transportation in Europe and elsewhere exists with reference

to the proposed canal from Lake Superior to the Mississippi, to-wit., the existence of a large amount of available bulk tonnage, such as coal, iron ore, stone, cement, steel and iron, general merchandise, wheat, coarse grain, flour and other like commodities, together with a large population at the terminii and adjacent to the waterway for the consumption and manufacture and use of such commodities, in addition to the fact that the canal will form a link between the great waterway transportation systems from the Atlantic seaboard via Erie Canal, Great Lakes, Mississippi River, Gulf of Mexico and Panama Canal.

21. TONNAGE ADDITIONAL TO LOCAL RAIL TRAFFIC OF 1912.

The Engineers in their report, as above, considered only estimated actual local rail traffic between principal terminals for the fiscal year 1912, as the basis for the volume of tonnage which the canal would handle.

To this, it is obvious, there are vital and important additions to be made, including tonnage allowances to meet the following conditions:

a. **Volume of annual traffic growth of canal zone,** including Duluth-Superior Harbor and Upper Mississippi ports, from 1912, when Engineers took local rail traffic data, to date when canal shall be completed and in operation, say 1918, period of six years.

b. **Volume of traffic developed by canal itself in canal zone,** through effect of 250 additional miles of transportation facilities afforded, (1) to hitherto undeveloped resources, (2) to commerce of existing lake and river terminals, (3) to existing manufacturing and agricultural industries, (4) to creation of new industries, (5) to creation of new commerce between local points, (6) to stimulus of lower and equalized transportation rates, (7) to co-operation between waterway and railways in developing tributary territory.

c. **Volume of new tonnage created by opening a through channel of commerce between the Government Upper Missis-**

sippi River project of navigation and Great Lakes navigation, thereby opening up navigable route for new commerce between North and South, Lakes and Gulf, Panama Canal and Great Lakes, and between the Upper Mississippi Valley and Eastern ports via the Erie and Welland canals.

d. **VOLUME OF INCREASED FARM AND MILL TONNAGE in 28 tributary Wisconsin and Minnesota counties** located partly within canal zone and partly on two sides of channel of connecting Upper Mississippi navigation project, being the river counties of these two states, the U. S. Census value of whose farms increased from $240,000,000 in 1900 to $456,000,000 in 1910—an increase of $216,000,000, or 90%, in 10 years—and subject to further immediate increase in value and tonnage upon development of their chief route of water transportation. These 28 counties in 1910 produced 62,000,000 bushels of grain, dairy output of 464,000 farm cows, 616,000 bushels of fruit, 1,878,000 tons of hay, and 13,000,000 bushels of potatoes—which will increase 50% by 1918. (See Exhibit 1 hereto attached.)

e. **Volume of new tonnage developed by U. S. Government $20,000,000 Upper Mississippi improvement project,** which will create commerce and transportation traffic on the Upper Mississippi by furnishing 6 feet of minimum low-water depth of channel in place of the former inadequate 4½ feet, and by construction of Lake Superior-Mississippi link will project the commerce of the Mississippi into a through Lakes-to-the-Gulf channel.

f. **Volume of new river tonnage at Minneapolis by completion of Government high dam across Mississippi in Twin City district extending Mississippi River navigation into Minneapolis,** to which the City of Minneapolis contributes $300,000 for municipal public docks, and to which Minneapolis manufacturers and jobbers have recently pledged 1,000,000 tons of new river merchandise tonnage.

g. **Volume of river-borne commerce that will be developed by completion of Panama Canal,** extending Pacific Ocean commerce into Mississippi valley, and by completion of the Lake

Superior-Mississippi project extending such commerce into the Great Lakes.

h. **Volume of lake-canal-river commerce that will be developed by new $130,000,000 Erie Barge Canal and public terminals,** the purpose of which is to secure the grain and flour tonnage of the Upper Mississippi and Great Lakes region for New York Harbor in exchange for merchandise to be shipped from New York to the Northwest.

i. **Volume of new tonnage that will be produced by the 48 iron and steel mills, furnaces, coke ovens, cement works and auxiliary plants of the Minnesota Steel Company at Duluth,** which occupy two miles of water-front on the Duluth-Superior Harbor and will probably be in operation next year for conversion of the product of Minnesota iron mines into finished products for Upper Mississippi Valley supply. This plant will also invite return cargoes from Upper Mississippi and St. Croix valleys of limestone for furnaces and cement works, brick and stone for construction work, and farm and mill produce for supply of Duluth-Superior mill, mine and dock population. This company, which is a subsidiary of U. S. Steel, will likewise supply the American Bridge Company, another U. S. Steel subsidiary, with structural steel for its plants at Minneapolis, St. Louis, and other Mississippi River distributing points and for the new warehouse which it is building at St. Paul.

j. **Volume of increased coal tonnage of extensive new coal-handling plants now building at Duluth-Superior Harbor giving that harbor 20,000,000 tons of lake coal-handling capacity,** with probable coal receipts for 1918 double those of 1912, and serving the double purpose of giving the lake iron ore fleet return cargoes from Lake Erie, and the Upper Mississippi valley high-grade Pittsburg coal for the development of its manufacturing industries and for domestic consumption.

k. **Largely increased volume of products of general manufacture both in canal zone and all manufacturing centers of Upper Mississippi valley** as resultant of following factors:

(1) Direct and indirect influence of Duluth-Superior steel and coal expansion with supplies of cheap and near-at-

hand materials for hundreds of auxiliary manufacturing enterprises throughout Northwest.

(2) New waterpower developments on Mississippi, St. Croix, St. Louis, and Rainy rivers and tributaries.

(3) Development of new hardwood, pulp-wood, stone and brick resources of upper St. Croix valley.

(4) Addition of 250 miles of waterway transportation facilities at reduced rates, in conjunction with completion of Panama, Erie Barge, and Welland Ship canals and $20,000,000 Mississippi River improvement, is logical forerunner of largely increased industrial tonnage.

22. SUMMARY OF ADDED TONNAGE OVER AND ABOVE 1912 LOCAL RAIL TRAFFIC:

First—Completion of industrial and transportation projects now in progress, directly or otherwise materially affecting Lake Superior and Mississippi River commerce and connecting canal zone, will reasonably produce by 1918 a traffic volume that will tax all available transportation facilities—rail, canal and river.

Second—During six-year period, 1912-18, normal development of industrial and commercial territory, including demands of new population and settlement and opening of lands, forests, mines, and starting of new towns and enterprises, require substantial addition to 1912 transportation facilities.

Third—Transportation routes, whether railway, highway, or waterway, are built on the basis, not of the commerce which actually passes before they exist, but of the commerce which reasonably will be developed as the result of their construction and operation in conjunction with other connecting routes working in co-operation for the development of resources.

Fourth—Chief among the considerations for opening a new route are its relations to other routes, and its effect upon the success of connecting projects; and the principal commerce which the proposed project should develop is through-tonnage as a link between the three greatest waterway projects of the U. S. Government, namely:

a. Mississippi River, for which total expenditures, appropriations, and estimates for improvements in progress, represent a prospective aggregate investment of $180,000,000—but without through channel of commerce.

b. Great Lakes system, representing heavy investment for harbor and canal improvements, resulting in development of the principal volume of American water-borne commerce—80,000,000 tons of freight yearly at estimated value of $900,000,000—and yet without through channel.

c. Panama Canal, representing ultimate investment of $375,000,000, its principal benefit to industrial interior depending upon Mississippi River and Great Lakes connections.

23. PROBLEM OF COMMERCIAL FEASIBILITY.

It will be admitted that the prospective tonnage demands of the canal zone and country tributary by the time the project can be completed and placed in operation will tax the railroads to full and yearly increasing capacity, as well as the river and proposed canal link working in co-operation, so far as volume of available tonnage is concerned. This resolves the question of commercial feasibility of proposed Lake-to-River canal link to the one point, namely—**the ability of the canal-and-river barge working on 6 feet minimum navigable depth of waterway to handle its due share of tonnage in competition with, or rather, in co-operation with, the box-car.**

ERIE CANAL RATE.

The comparative cost of transportation being a prime factor in the ability of the canal barge to secure and hold business, the engineers properly sought a standard rate for such waterway for comparison with the present rail rate and decided that the Erie Canal rate offers such a standard. Under normal conditions the Erie rate would be a fair standard of comparison, but we submit it is manifestly unfair to offer the Erie rate as a standard for comparison with proposed canal because the Erie canal has not been operated since 1885, except under decidedly adverse conditions tending to divert traffic from canal to rail and to increase costs of canal transportation. The adverse and abnormal conditions present on

the Erie canal during the entire period of comparison can and will be prevented from operating to the detriment of the proposed canal. The hostile and adverse conditions which prevented the normal development of traffic on the Erie Canal have been fully described in the reports of the Inland Waterway Commission, National Waterway Commission and Report of the House Committee on Merchant Marine, from which we have heretofore freely quoted and embraced the following almost wholly and artificial and preventable adverse conditions:

1. Ownership by railways of docks, terminals, elevators, loading and unloading facilities at Buffalo, New York and other points along the canal and consequent control of charges for use thereof.

2. Railway control of canal boat lines and freight forwarding agencies.

3. Ownership of lines of vessels operating on the Great Lakes.

4. Agreements between owners of rail lines east of Buffalo and New York and west of Duluth and Chicago.

5. Discrimination against canal traffic aided by ownership and control of the foregoing agencies, all operating together to divert traffic from canal to rail, including refusal to make equitable through canal, lake and rail rates or divide such rates on any equitable basis; refusal of rail lines and vessels controlled by railways to carry freight from canal except at high local discriminating rates; refusal of rail or lake carriers controlled by railways to deliver freight to canal boats except canal boats owned or controlled by railways; refusal to permit independent canal boats to use docks, terminals, elevators, etc., except at high and discriminating rates or upon conditions giving railways absolute control of traffic on canal.

The effect of all the foregoing adverse conditions was to prevent improvement in type of canal boats, great loss of traffic on canal generally, failure to repair or keep up depth of canal, and altogether would have resulted in total abandonment of canal, except that the people of New York becoming aroused to threatened destruction of cheaper waterway trans-

portation determined to rebuild canal and rehabilitate and restore canal commerce.

Under the circumstances the Erie Canal rate standard should be considerably discounted.

The information of the Local Board is, that the average Erie Canal rate is 3 mills per ton per mile; which would make the total freight charge for the 260-mile haul from Duluth to Minneapolis via proposed waterway 78 cents a ton.

Consensus of Erie Canal authority, however, appears to indicate that the Erie rate during the past 20 years, even under adverse conditions, is approximately 2 mills per ton-mile, and that modern methods and efficient administration devoid of hostile control would have materially reduced this average, even on the old canal and ancient-type boats, now practically abandoned to make way for the new barge canal which is nearing completion.

As the difference between 2 mills and 3 mills makes 25 cents per ton on the 250-mile haul, and therefore is material to the question of commercial feasibility, we take the liberty herewith to introduce authorities:

a. Hon. A. Barton Hepburn (former comptroller of currency, president Chase National Bank, member New York Chamber of Commerce) on page 104 of "Artificial Waterways and Commercial Advancement," (Macmillan Co., 1909) publishes average New York canal and railway rates for 15-year period, 1903-1907 inclusive, as follows:

Average Ton-Mile Rate (in Mills.)

5-Year Period.	Canal Rate.	Railway Rate.
1893-97	2.0 mills	6.2 mills
1898-02	1.9	5.8
1903-7	2.0	6.3

Fifteen-year average as found by Mr. Hepburn was 2 mills per ton-mile by canal, compared with 6.1 mills by rail; average 15-year by canal being one-third of rail rate. This canal rate was made by small old-type wooden canal boat. Engineering data was given showing that by modern methods the 240-ton boat could carry freight at 1.75 mills per ton-mile;

while a 320-ton boat would reduce the rate to 1.16 mills, and 450-ton barge to .88 of 1 mill. Mr. Hepburn deplored neglect of canal, which found "yearly expression in the loss of commerce to the City of New York," and charged R. R. influences as "largely responsible for the inefficient canal policy of the State." Mr. Hepburn derived his information from New York canal commissions and engineers specially designated to secure reliable expert data. His high financial and business standing, both in city and nation, render him an authority in the field covered by his volume.

b. U. S. Bureau of Railway Economics, 1911, quotes Erie Canal rate as 2 mills per ton-mile.

c. U. S. Inland Waterways Commission, (Government Printing Office, 1908, page 238, quoting U. S. Statistical Abstract and reports of U. S. Department of Agriculture), publishes average annual canal and rail rates in New York for period of years, from which the following data for 1895-1905 are in comparative agreement with data of Mr. Hepburn:

Average Railroad and Canal Freight Rates Per Ton-Mile.*

Year.	New York Central R. R.	New York Canals.
1895	7.26 (mills)	1.5 (mills)
1896	6.68	2.5
1897	6.79	1.9
1898	6.10	1.9
1899	5.90	1.9
1900	5.6	1.7
1901	....	2.3
1902	6.3	2.5
1903	6.4	2.7
1904	6.6	2.1
1905	6.1	2.6
Average 1895-05	6.37	2.14

*Wheat is the commodity chiefly used as a basis, and for the haul over the Erie canal and river from Buffalo to New York.

During five years of the above period the rate was below 2 mills per ton-mile, ranging from 1.5 to 1.9 mills. Grain over the Erie is carried in the old wooden 240-ton barges of ancient type; whereas the proposed Lake Superior-Mississippi Canal will accommodate 550-ton barges. From 1901 on the Erie

Canal and equipment were allowed to fall into neglect because the State was starting upon the new project which called for new and larger type barges; so that from 1901 to date the canal traffic passed largely into the h ls of the railroad companies at increasing rates. It will ... noted, however, that with all these handicaps the canal carried the freight at one-third the rail rate.

d. The movement for the rehabilitation of the Erie and other New York canals took head under the administration of Governor Theodore Roosevelt in the appointment of a State Canal Commission to investigate commerce and canals. The New York Produce Exchange and Chamber of Commerce took leadership in this movement with a view of restoring to New York its commerce with the West; New York grain receipts, including flour, having fallen off upwards of 75,000,000 bushels. Through railroad control and neglect, New York grain receipts on the Erie canal fell off in 25 years 50,000,000 bushels. In its report of 1901 (page 9) the New York Canal Commission described the rate and the conditions on the Erie canal as follows:

> **"On the canals of New York, where the boats are very small, the waterways greatly restricted, and obsolete methods are employed for handling business, it is about 2 mills per ton mile."**

e. National Waterways Commission, in final report of 1912 (p. 574), says of the Erie Canal rate:

> "The committee on canals in New York State in 1899 estimated that **freight could be conveyed on the Erie Canal for 1.75 mills per ton-mile even after making allowance for the fact that a boat could only make seven trips during the season of navigation, and traveled one way with only a third of a load.** As a matter of practice, the cost has averaged more than 2.45 mills, or an increase of 40 per cent, due to the lack of ideal conditions."

f. Perhaps the most elaborate detailed engineering estimate of Erie Canal cost of transportation was that of Major Thomas W. Symonds of the U. S. Engineering Corps, which was made under the auspices of the New York Canal Com-

mission. The report discusses condition and capacity of channel, type, capacity, speed and cost of canal boat, handling and cargoes of tow fleet, number of trips per season, wages, subsistence, fuel, oil, insurance, motive power and repairs, with 5% interest on investment and for depreciation.

Even with antique 240-ton wooden canal boat making but seven trips a season, Major Symonds presents detailed data showing cost of hauling wheat from Buffalo to New York over Erie route 1.75 mills per ton-mile.

Applying same method to "Seymour" canal improvement plan allowing use of 320-ton boat, Major Symonds reduces ton-mile cost to 1.16 mills.

"Seymour-Adams Plan" allowing use of 400-ton boat reduced cost, according to Major Symonds, to 1 mill per ton-mile; and "Committee Plan" providing for use of 450-ton boats made still further cut to .88 of 1 mill.

g. Report of U. S. Engineers Potter, Shunk and Peek (May 14, 1913) finds that Lake Superior-Mississippi River project will accommodate use of 550-ton barges. These have double capacity of old Erie barges, are up-to-date and best modern type, and make far better speed and several times as many trips in a season. Therefore, they should average a lower rate, and should do materially better than 2 mills per ton-mile, or 50 cents per ton for 250 mile haul. In Section 99 of the report, the Local Board of Engineers estimate that the canal fleet, consisting of tow vessel and four 550-ton barges, requires 9 days for the round trip from Duluth to Minneapolis and return, or "25 round trips in a season". On the old Erie Canal, according to Major Symonds, the tow vessel handles four 240-ton barges at the rate of only seven round trips per season, and still does the work at 1.75 mills per ton-mile, including all operating and fixed charges. It appears that the situation on the Lake Superior-Mississippi River project, therefore, is more nearly analagous to the plans submitted by Major Symonds and the New York Canal Commission providing for the use of 400-ton and 450-ton barges at a cost of 1 mill per ton-mile.

COST OF TRANSPORTATION ON MONONGAHELA RIVER.

25. The Monongahela River, which joins the Allegheny at Pittsburg to form the Ohio, offers the example of a waterway that has escaped control of hostile influence and is maintained by the Government in a condition for successful operation as a commercial waterway, just as the Erie during the past twenty years is a warning example of how a once successful waterway may be suffered through hostile influence to fall into a condition of neglect.

The Monongahela, year after year for years, has furnished Pittsburg a large portion of its coal supply. It seldom handles less than 10,000,000 tons a year and from that up to 12,000,000. Monongahela barges deliver this coal at Pittsburg at a transportation rate so low that railroad competition, so far as the rate is concerned, is out of question. At the same time, the Monongahela as a whole is a 6-foot project—six of its fifteen locks through the central section of its 131 miles from Fairmont to the mouth having only 5 to 6 feet depth on the lower sills—and the bulk of its freight is carried in **boats, barges and flats of 300 to 500 tons cargo capacity, such as readily would find ample navigable depth on the proposed Lake Superior-Mississippi River Route.**

a. **Chief of Engineers, U. S. Army, (Report of 1912, Part 1, page 894),** says of effect of Monongahela on freight rates:

"The effect on freight rates of the slack-water system of the Monongahela is great. This is particularly true for coal, which is the principal article of commerce, and is well shown by a comparison of the railroad rates for carload lots along this river and those along the unimproved Allegheny. There are many mines along the Monongahela River that can ship by rail or by water, and within a distance of 45 miles from Pittsburg, which practically covers the industrial district on that river, there is a rate of 10 cents a ton on hauls not exceeding 7 miles. For corresponding distances on the Allegheny the rates average about 35 cents a ton. One large consumer **transports coal by river a distance of about 50 miles at a total cost of less than 10 cents a ton, including all charges, while the corresponding railroad freight rate is 45 cents a ton.**"

On the basis of the above official statement of the Chief of Engineers, the saving in cost of transportation by water, including all charges, is 35 cents a ton on a 50-mile haul.

b. **U. S. Inland Waterways Commission** (Page 113 of 1908 report) states that the Jones & Laughlin Steel Company, through its coal and river navigation subsidiary, the Vesta Coal Company, enjoys on the Monongahela "the cheapest transportation service in the world, carrying coal between the mines and the mills, **a distance of 48 miles, at the low cost of 3½ cents to 5 cents per ton.**"

On page 108 of the same report, the Commission gives the coal fleet of this company, as **160 barges of 300 tons net cargo tonnage each and 31 barges of 500 tons each.** Thus the record for low cost of transportation is made in river barges of the cargo capacity adapted to the proposed waterway project under discussion.

Excepting the three lower locks on the Monongahela in the Pittsburg district, depth on the lower sill of Monongahela locks is similar to that on proposed Lake Superior-Mississippi project and on the upper Mississippi project. Twelve of the 15 Monongahela locks (See Exhibit 1 hereto attached) have 5 to 7 feet depth on lower sills. Locks numbered 4 to 9 inclusive, which are located in the middle section of the waterway, 40 miles to 100 miles above the Monongahela mouth, have depths ranging from 5.2 to 6 feet. During the dry season this section, as shown by reports of U. S. Engineers, frequently has only 5 feet of navigable depth. Tow vessels and barges used on the Monongahela have average draught of 4 to 5 feet.

c. **Proceedings of Engineers Society of Western Pennsylvania**, (p. 270, June 1908 session) contain the statement in regard to cost of coal transportation on Monongahela:

"A local interest tows its coal from Pool No. 4 (located 41 to 58 miles above Pittsburg) to Pittsburg at **cost of about 4 cents per ton by river—and that too on a stream where the lockages are limited to a certain extent—whereas the coal tariff rate by rail for the same distance is 33 cents per ton.**"

d. In the same proceedings U. S. Engineer Thomas P.

Roberts (U. S. Engineers Office, Pittsburg) in a paper (p. 204) discussing Ohio and Monongahela transportation, including types, costs, and methods of handling river boats and fleets predicts smaller but more numerous fleets at less capital investment and cost of transportation, and concludes:

"We may expect, therefore, a lowering of freight rates on a river where the cost of transporting cargoes in fleets of barges is already lower than it now is with single 12,000 ton steamers on the Great Lakes."

e. **United States Engineer Office, Pittsburg,** by direction and in the absence of Lt. Col. Francis R. Shunk, transmitted to the commission on Nov. 7, 1913, in answer to questions submitted in writing, the following detailed data of cost of transportation on Monongahela, prepared by Assistant Engineer Thomas P. Roberts (See Exhibit 3 attached):

"Several years ago the Jones & Laughlin Steel Company reported officially that the actual cost to them of moving coal from their mines to their mills and coke ovens in Pittsburg, then doing a business of **2,000,000 tons per annum, was 4.2 cents per ton. The round trip distance was 104 miles,** including the passage of 3 locks in each direction. The estimate included the return of the empty boats to the mines. The final result was a ton mile rate of .08 cents. To this was added by this office interest account on capital invested at 5% and 15% for depreciation of floating plant, which brought the ton-mile rate up to .18 cents, or, one mill and eight-tenths."

On this computation, the cost of operation was eight-tenths of 1 mill per ton-mile, while 20% to cover interest and depreciation added 1 mill more This estimate of 20% for fixed charges would pay for first cost of fleet in five years, and would appear unnecessarily high. If the more common estimate of 10% for interest and depreciation were used, the total cost of transportation would be 1.3 mills per ton mile.

The same inclosure (Exhibit 3) gives average capacity of Monongahela boats, barges and flats at 200 to 500 tons; and that the Pittsburg District (for several years past) receives about 12,000,000 tons of cargo coal per annum.

f. **Chief of Engineers, U. S. Army, in his report for 1912** (Page 905 of Part 1) **sums up the case thus:**

"A comparison of the cost of delivery of Monongahela River coal by rail and by river to points in the pools above Dam 6 shows a saving of from 30 to 50 cents a ton in favor of water transportation."

g. In answer to the inquiry of the Minnesota Commission for detail on which the above estimate was based, U. S. Engineer Office, Pittsburg, by Chief Clerk A. J. Rossiter, for and in the absence of Lt. Col. Francis R. Shunk, Corps of Engineers, forwarded, Nov. 14, 1913, the following information (See Exhibit 4) prepared by Thos. P. Roberts, Assistant Engineer:

"Reference is to Dam 6 on the Ohio, about 29 miles **below** Pittsburg. The center of the active river mining district on the Monongahela is about 50 miles **above** the city. The 50-cent saving is therefore for the 29 plus 50, or 79-mile distance, and the 30 cents for the 50 miles distance to Pittsburg."

26. APPLICATION OF MONONGAHELA RIVER AND ERIE CANAL RATES TO PROJECT:

Following are some of the features which make water transportation on the Monongahela and Erie similar to that on Lake Superior-Mississippi canal and upper Mississippi:

a. **Depth of navigable channel,**—Coal originating on Pool No. 4 on Monongahela, 50 miles above Pittsburg, passes Lock No. 4 (Exhibit 3) which has 5.87 feet depth on lower sill and at time above detailed statistics were furnished had dimensions of 158x50 feet. Locks on Lake Superior project as proposed by Engineers have 6 feet minimum depth and are 175x 35 feet. Although former depth of Erie was nominally 7 feet, actual navigable depth was allowed by neglect to fall to about 5 feet and permitted boats of only 4 to 4½ feet draught and 240 tons of cargo.

b. **Cargo capacity of boats and barges**—U. S. Engineers report 550-ton barges adapted to Lake Superior-Mississippi projects. Vesta Coal Company which makes record of 4 to 5

cents per ton on coal for 50-mile haul and return trip on empties—or less than 10 cents including all charges as reported by Chief of U. S. Engineers—uses 160 boats of 300 tons cargo capacity and 30 barges of 500 tons. One of its principal model towing vessels, the "Vesta", which tows five to seven 500-ton barges, and has speed of 10 to 12 miles an hour, has draught of 4.1 feet. On Erie Canal only 240-ton boats were used. On Champlain Canal, during season of 1913, canal boats carrying coal from New York Harbor to Montreal and Quebec were allowed to load only 160 tons, and tow vessels with capacity of 13 boats were allowed to haul only five because of condition of canal, and yet the canal-and-river route of 320 miles from Perth Amboy to Quebec took the coal business away from both the railways and ocean vessels.

c. **Return cargoes for canal and river**—Monongahela coal barges which haul 10,000,000 tons of coal to Pittsburg have no return cargoes, and the low rate made covered cost of return trip of empties. Wheat boats which carried the heavy grain tonnage on the Erie from Buffalo to New York made the return trip with only one-third cargoes, because merchandise on the average makes light tonnage. The Lake Superior-Mississippi project, on the other hand, has cargoes both ways. Coal, iron, steel, cement, and merchandise comprise the down-tonnage from the Lakes. Wheat and coarse grain from one of the leading grain districts of the world, flour from the greatest flour-milling center on the globe, linseed oil and cake from the chief linseed manufacturing center, limestone from the St. Croix and Upper Mississippi ledges for Duluth-Superior furnaces and cement works, potatoes and general farm produce for the mine, mill and dock population on the Lakes and for Eastern shipment, brick and various building materials for Lake and Eastern construction enterprises—constitute a return tonnage which does not exist on either Monongahela or Erie. Then there is the through-tonnage from the Mississippi valley and gulf, and varied local tonnage arising in canal zone.

d. **Rates which such conditions afford**—Under parallel conditions, or in several respects less favorable conditions, on the Monongahela river and Erie Canal, barge and boat equip-

ment of capacity similar to that recommended by Engineers for Lake Superior-Mississippi project shows transportation cost of 1 to 2 mills per ton-mile. This would be 25 to 50 cents per ton for the Duluth-Minneapolis haul, as compared with $1.02 which engineers estimate as average rail charge. Under such conditions the project should have no difficulty in securing and holding its due share of the large tonnage which will tax rail, canal and river by the time the canal link can be completed and put in operation; and thus insure the commercial feasibility of the barge route, in competition with, or in co-operation with, the box-car.

e. **Advantages of new and up-to-date equipment, methods of handling, and mode of administration, and of new and rapidly growing territory and resources**—The new enterprise, moreover, will be launched under new and hopeful auspices, free from hostile influences or control, when the country is turning to waterways as a necessary aid to railways, and will have new and up-to-date equipment and administration in a section of tremendous resources and yearly development.

27. **WATERWAY FROM ALABAMA COAL FIELDS TO MOBILE:**

The government is now entering upon the completion of the 6-foot navigation project of canalizing the Mobile, Tombigbee, Warrior and Black Warrior rivers for a distance of 443 miles from Mobile Bay to the northern Alabama coal fields. Estimated cost is $8,675,000, and about 20 locks and dams are required. The Alabama and New Orleans Transportation Company is having 15 steel self-propelling producer-gas barges built by the Great Lakes Engineering Works, of Detroit, for the development of the coal fields and the transportation of the product to Mobile, New Orleans and Pensacola. The first barges have started upon their work.

In an article in the Engineering News of December 4, 1913, the barges used by the above company are fully described as well as the canal and waterway upon which the fleet of barges operate. Mr. John H. Bernard, the designer and builder of the barges used by the above company, in a letter to the counsel for the Minnesota Commission, dated April 9, 1914, says:

"At present the Alabama & New Orleans Transportation Company has seven finished barges of the type described in said article; said barges have been running for several months, the first one being in operation since July of last year and beyond the troubles resulting from inexperienced crews have given perfect satisfaction, moving their freight (in this instance coal) at less than 2-5ths mills per ton mile.

"The barges are designed for 6 foot navigation and indeed have to meet a great variation of conditions in the water route as to depth, width and swiftness of current. The river runs through the coal fields and the coal is dumped from the mine cars into the loading station from which the 1,000 ton barges are loaded with their cargo at the rate of 500 tons per hour. It costs approximately 2¼c per ton to load and 3c per ton to unload.

"I believe the barges would be especially adapted for use from Lake Superior through the St. Croix river to the Mississippi river and thence down said stream.

"I am positively sure of the above cost of loading and unloading which is a matter of record in our office and will be able to prove to any one at any time, the correctness of said figures.

"I note the local engineers charge the canal 25c to load and 25c to unload, and beg to state that they are making a serious blunder. In Norfolk, coal is loaded into the bunkers of sea-going vessels, for a total cost, including trimming, of 7c per ton, but, where the vessel is a self trimmer, as these barges are, only 4½c per ton is charged.

"I note further that the local Board of Engineers have charged that the coal is deteriorating 25c per ton on account of handling with the clam shell. To be short in my reply to this, I would like them to quote me one instance where this has cost such an amount of money. I can cite instance after instance where coal has been handled by clam shells and deterioration is not sufficient to take account of in figures.

"It will be possible to build self-propelled barges that would operate economically on the Canal under discussion with a carrying capacity of 500 tons, and I would undertake to state that you should be able to handle coal from Lake Superior to the Mississippi River including cost of loading and unloading, for less than 25c per ton.

JOHN H. BURKHARD.

The Lake Superior-Mississippi River project, like the Alabama project, will find coal its chief commodity. The rate of 30 cents per ton on coal from Lake Erie to Duluth-Superior equals in cost a haul of 50 miles by rail. This is equivalent to the location of the lake terminus of the Lake Superior-Mississippi canal within 50 miles by rail of the Lake Erie ports which handle 24,000,000 tons of Pennsylvania, Ohio and West Virgina coal. The Alabama project has a haul of 443 miles from the northern coal fields; while the Lake Superior-Mississippi project has a haul of 210 miles from the lake supply to the Mississippi river, and a large group of Upper Mississippi distributing centers and river terminals for the consumption and distribution of its coal cargoes; 237 miles to St. Paul and 250 miles to Minneapolis. The logic which justifies the Alabama project, therefore, applies with force to the Lake Superior-Mississippi project; for Minnesota and Wisconsin produce no coal, and the source of the best and cheapest coal for about 2,000,000 population in the cities and counties of the canal zone and tributary to the Mississippi in those states, is the Great Lakes supply which has the 30-cent rate from Lake Erie.

28. KANSAS CITY RIVER TRANSPORTATION PROJECT.

Another navigation project authorized by the Government is $20,000,000 to provide a 6-foot channel for the 408 miles from Kansas City to the mouth of the Missouri River. Kansas City merchants and manufacturers have organized the Kansas City Missouri River Navigation Co., a million dollar boat line and opened river service from Kansas City to St. Louis, on present 4½ foot depth. Three modern steel tow-vessels of the tunnel-screw type and seven barges have been installed in freight service; and the city is providing proper public docks and freight terminals.

The above company commenced operations last season on the unimproved river, handling a comparatively small tonnage on account of the unusually low water occasioned by very severe drouth in the district. The fleet handled very little bulk freight, most of the tonnage being package freight and a great deal of it high class. We quote from a letter from the

secretary of the Kansas City Missouri River Navigation Company:

> "Our rates are uniformly 20% lower than the rail rates between the points we reach and we absorb the switching charges on carloads so as to give the shipper a net saving of 20% as compared to rail rates."

Thus Alabama, Missouri and Monongahela projects are all 6-foot channel projects, and will float the same capacity of river barges as the Upper Mississippi 6-foot project and the proposed Lake Superior-Mississippi 6-foot project; and the commercial feasibility of these 6-foot projects successfully competing with the railroad is sustained by the action of the government. If it is commercially feasible to expend $20,000,000 to give Kansas City and the valley of the lower Missouri transportation access by water with the Mississippi; similar logic would find it commercially feasible to expend $7,815,000 to give the Mississippi valley a through channel into Lake Superior, the commerce of which as measured by the Soo Canal includes 75,000,000 tons of freight values at $800,000,000.

30. TRAFFIC EXTENSION ON ALLEGHENY AND MONONGAHELA.

Chief of Engineers, U. S. Army, (1912 report, 897-9), discusses project adopted by Congress for construction of five additional locks and dams on the Allegheny to extend slackwater navigation to a point 61 miles above its confluence with the Monongahela at cost of $2,788,000. On that part of project already completed, 1,374,626 tons of coal were moved in 1911. The purpose as defined by Chief of Engineers is "**to give manufacturing plants in this section the benefit of the cheap river rates on coal and other supplies.*** Even under existing conditions one large consumer of coal reports a saving of 25 cents per ton on Monongahela River coal delivered by water compared with delivery by rail.**"

Similar benefits of cheap water rates would accrue to the Northwest on coal, iron and steel from Duluth-Superior harbor to manufacturing plants at Stillwater, Hastings, St. Paul, Minneapolis, South St. Paul, Red Wing, Lake City, Wabasha,

Winona, La Crosse, and Eau Claire, and other tributary river manufacturing centers, which have an aggregate city population of 750,000, with an assessed taxable valuation of $400,000,000, and whose 2,100 manufacturing plants, according to the U. S. industrial census of 1909, employed $185,000,000 of capital and turned out a product valued at $260,000,000.

Expansion of river coal and steel traffic up the Monongahela river and on the upper Ohio is described on page 9 of the final report of the National Waterways Commission (1912.) Reference is made to the new works of the American Bridge Company, at Ambridge, 15 miles below Pittsburg, for the manufacture of steel barges, scows and other steel water craft, and also to the water navigation plans of the Crucible Steel Company of America, which "is practically ready to commence transporting its coal by water from the sixth pool in the Monongahela River to its mills and factories at Pittsburg and at Midland, 36 miles below. **This coal was formerly obtained entirely by rail. This company expects to transport by river about 1,000,000 tons of coal annually, and also to transport its pig iron and steel products by water to lower river ports.**"

The sixth pool on the Monongahela, where this company gets its coal, is located 70 miles above Pittsburg, and the depth on the lower sills of (See Exhibit 2) Locks 4, 5, and 6, which the coal barges pass is only 5.2 to 5.8 feet. Moreover, the river bank for this haul is thickly paralleled with competing coal railroads; which makes a convincing practical argument for the superior commercial feasibility of the waterway as compared with railway in coal transportation.

If further demonstration were required of the superiority of water transportation in coal handling, it is furnished in the fact, that the Pittsburg Coal Company, which is the leading coal company for the supply of Duluth-Superior and the proposed canal zone, including the Twin Cities, has acquired possession of the largest bulk coal carrier on the Ohio, Mississippi and tributaries—namely, the Monongahela River Consolidated Coal and Coke Company, which operates 80 towboats and steamers and 4,000 coal boats, flats and barges, with cargo capacity of over 2,500,000 tons, and handles by river 4,500,000

tons of coal per annum.

As showing what the leading steel corporation in the world thinks of the commercial feasibility of river transportation of coal,—although this corporation itself owns and operates railroads,—the contract made by the United States Steel Corporation with the Pittsburg Coal Company, as shown by Government testimony, by which the coal company for a period of 25 years is to provide the steel company with coal for its use, through the Monongahela River Consolidated Coal and Coke Company, requires delivery by water whenever possible because cheaper.

The Steel Company's further recognition of the superior commercial feasibility of river over rail in coal transportation is shown by the enterprises and operations of two of its distinguished subsidiary companies, namely:

American Steel and Wire has installed a fleet of 100 barges and towboats for moving its coal on the third and sixth pools in the Monongahela river to its mills at Donora, Rankin and Braddock, and to its Schoenberger mill on the Allegheny; while the American Bridge Company is building for various U. S. Steel plants located on rivers and canals the necessary barges, towboats, and other steel watercraft.

31. CAUSES OF DECLINE OF RIVER COAL AT CINCINNATI.

Lieut. Col. Potter and associate Engineers express apprehension of the ability of the Lake Superior-Mississippi canal and river route to secure and hold the canal tonnage because of certain experience of Cincinnati in regard to the Ohio river coal business. Quoting a letter from the Cincinnati Chamber of Commerce, in which the railroads are cited as cutting into the river traffic, Col. Potter says that this "indicates that the railroads are running the Ohio River, the greatest coal river in the world, out of the coal business, on a haul of 200 or 300 miles, although the actual difference in freight rate in favor of the water haul is 37½c to 50c."

The apprehension thus expressed is not borne out by recent traffic data. At the same time, it is plain that certain coal

carrying railroad companies did make a well concerted effort to throttle the Cincinnati river coal business. As brought out by government investigation by Congress and the Bureau of Corporations, the coal roads brought the following methods to bear in depriving the river lines of coal traffic: (1) purchase of competing lines which handle river coal, (2) control of terminals and terminal charges, (3) discriminating joint rates and prorating against river carriers, (4) secret rates, (5) discriminating switching charges, (6) purchase of controlling interest in coal lands and mines.

Remedy for such practices, however, lies in Government prosecution and control of traffic and not in defeating the opening of additional waterways. That the conditions at Cincinnati have already been materially righted is shown by the statistics by "The Coal Trade" (1913), Frederick E. Saward, Editor: Cincinnati coal receipts from the Kanawha River increasing from **867,560 tons in 1908 to 1,531,572 in 1911,** and the river receipts from the Pittsburg district **increasing from 535,880 tons in 1908 to 1,313,981 in 1912.** Thus the causes of apprehension at this point are already removed.

Indeed, the 1912 report of the Chief of Engineers, U. S. Army (page 2366), indicates that river coal traffic on the Kanawha River canalized project has been highly feasible from a commercial standpoint. In 1911 the 55-mile haul through the Kanawha locks bore a coal cargo of **1,346,140 tons at the rate of .97 of 1 mill per ton mile.** The report also shows that between Charleston and Montgomery, West Virginia, the rail **charge of 50 cents per ton has been reduced by the canalized river to 5 cents per ton**—an achievement stamped with a high order of commercial feasibility.

32. CHIEF OF U. S. ENGINEERS ON UPPER OHIO RIVER TONNAGE.

By way of further relieving the apprehensions of the Local Board of Engineers with reference to defeat of inland waterway transportation of freight, the Ohio River system in particular, through action of the cause specified, to-wit:—"the

railways are running the Ohio river, the greatest coal river in the world, out of the coal business"—We herewith summarize the freight tonnage, of which coal is the leading commodity, of the Ohio and principal tributaries for the year 1911, as reported by the Chief of Engineers, U. S. Army, to the Secretary of War, Washington, D. C., Oct. 8, 1912, as follows:

River.	Page of Report.	River Tonnage 1911.
Monongahela	2308	10,747,041*
Allegheny	2311	1,720,742**
Pittsburg Harbor	2341	12,519,776(a)
Locks 1-6, Ohio	2337	4,105,649
Kanawha	2366	1,392,788
Little Kanawha	2360	120,244
Muskingum	2370	72,145
Big Sandy	2390	181,770
Kentucky	2406	209,249
L. & Portland Canal..	2426	944,656
Green River, Lock 1..	2444	329,032
Ohio River Commerce.	2287	11,771,892(b)

*Estimate of which report says: "which amount is manifestly less than the actual movement of commerce." The 15 Monongahela locks show a total of 28,442,579 tons of down-river tonnage and 2,786,396 of up-river tonnage. To eliminate duplications, U. S. Engineers took downstream tonnage at Lock 3, plus upstream tonnage at Lock 1, plus coal mined in Pools 1 and 2, as a basis for estimate. This, of course, covers business in and out of Pittsburgh Harbor, but omits commerce which begins and ends between mines and mills and towns located between Locks 3 to 15 inclusive, covering 90 miles of the total 131 miles of the canalized river between Pittsburg and head of slackwater, four miles above Fairmont, West Virginia, which doubtless would extend the Monongahela River total to 12,000,000 tons.

**This is simply the tonnage reported by leading shippers; and would exclude a large number of small or intermittent shippers, and others not filing regular reports.

(a) Largely local business of mines and mills, coke ovens and furnaces, in Pittsburg District, including some through tonnage from Monongahela mines to Ohio and Mississippi points.

(b) Reported by Lieut. Col. Jervey, in chapter on First Cincinnati District of the Ohio River, and doubtless covers tonnage passing through that district.

33. SUMMARY OF UPPER OHIO AND TRIBUTARY RIVER TRAFFIC.

It is difficult to estimate how much of the total 44,000,000 tons of freight handled by river boats and barges on the Ohio and upper tributaries is net tonnage and how much should be eliminated as duplication. Omitting the 12,500,000 of Pittsburg harbor and 11,700,000 of Ohio River proper, we have 20,000,000 tons on the tributaries. To this should be added that which originates for Ohio and Mississippi commerce in the Upper Ohio ports, exclusive of the tributaries. This would doubtless make a total net tonnage of somewhere between 25,000,000 and 30,000,000 tons. It would therefore appear, that in spite of all natural and likewise all abnormal and preventable obstacles which have hampered river commerce on the Ohio and upper tributaries, that traffic has demonstrated the commercial feasibility of inland waterways in the United States and justified the faith of the Government and the loyal efforts of the Engineers in charge.

Summarizing these results with reference to features applicable to proposed Lake Superior-Mississippi river-and-canal route we find:

(a) That 20,000,000 tons of freight are carried on canalized tributaries of the Ohio River at rates so far below rail rates, that industrial interests affiliated with railways are compelled to use the slackwater barge-fleet in preference to the roads paralleling the streams.

(b) That these canalized tributaries are Government 6-foot depth of channel projects financed and operated by the General Government.

(c) That the boats, barges and tow vessels used are of the draft and cargo capacity recommended by the Engineers for the Lake Superior-Mississippi 6-foot project.

(d) That, on the authority of the Engineer in charge on the Monongahela, the 500-ton barges delivering coal in that district have reduced cost of transportation to the basis of the 12,000-barges on the Great Lakes—the lowest transportation cost known.

(e) That, on the authority of the Chief of Engineers, U. S. Army, the saving is as much as 30c per ton on a 50-mile haul and 50c on a 79-mile haul which applied to the Lake Superior-Mississippi coal haul would commercially justify the project.

(f) That the practical experience and close engineering estimates of the leading coal, iron and steel interests of the greatest coal, iron and steel district in the world compel them to substitute the 500-ton barge for the box-car in handling their products, notwithstanding their own railway affiliation and even ownership and operation of coal roads.

Finally, we find that these same industrial interests of the Pittsburg coal, iron and steel district now propose to finance the construction of a $60,000,000 canal from Pittsburg to Lake Erie, so as to secure the commercial benefits of low canal cost of transportation to the Great Lakes—even though the actual cost of rail transportation over roads owned and operated by them over that route is reported as low as 3 mills per ton-mile.

34. PAST OBSTACLES NOT NECESSARILY APPLICABLE TO FUTURE PROJECTS:

Among the preventable obstacles over which this successful river commerce has triumphed—obstacles which under the present temper and probable future policy of the Government and of the public in this country will find little toleration and excuse for existence—may be briefly enumerated the following, the abatement or amelioration of which is a material factor favorable to the pending project:

(a) Lack of a defined national waterway policy with necessary executive powers and funds to make such policy effective.

(b) Lack of standardization in depth of channel and type of equipment so as to create channels of commerce.

(c) Lack of co-ordination in projects undertaken so as to create an inter-locking system of waterways necessary to the existence of channels of waterway commerce.

(d) Failure of past Congresses to provide Government Engineers with means to put into successful operation projects undertaken.

(e) Failure to give the Interstate Commerce Commission sufficient jurisdiction over waterway and joint water-and-rail transportation to prevent destruction of river-and-canal traffic by discriminating railway rates and prohibitive terminal and switching charges, by refusal to provide connecting railway service with joint through rates for water lines and carriers, and rebates, secret rates and intimidation of shippers.

(f) Failure of the Government to prevent railway control of canals, terminals, waterway equipment, and water transportation agencies and traffic.

(g) Consequent railway control of waterway channels, terminals, frontage and boat lines; paralleling of rivers and canals with tracks preventing waterway locations for mercantile and manufacturing plants and sites necessary for handling water-borne freight; erection of low bridges prohibiting use of large-type boats; diversion of traffic so as to substitute a profitable rail haul for low-cost water service; arbitrary terminal charges killing river commerce, and general neglect of waterway and bankruptcy of boat line owners.

Detailed data and citations on this phase of the subject, in addition to those herein quoted, may be had by consulting reports of Chief of Engineers, U. S. Army; reports of Bureau of Corporations of the Department of Commerce, of House committee on merchant marine and inland waterways, of the National Waterways Commission, of the Interstate Commerce Commission, and of testimony of business men and naval and marine engineers, experts, shippers, boat owners and operators before various Government authorities.

Consideration of the above conditions in connection with proposed report is made necessary and germane to the question of commercial feasibility by reason of the position taken by the Local Board of Engineers, in the report of May 14, 1913, in assuming as fundamental to the operation of the canal and the receipt, distribution and terminal handling of traffic such arbitrary conditions as the following: (1) A terminal

charge of 25c per ton at each end of the barge route, which at the outset would perhaps kill any inland waterway project; (2) dependence upon arbitrary will of competing roads for any traffic whatever; (3) control of terminals, terminal freight-handling, and terminal charges by railroads; (4) railroad owned boat lines on the Great Lakes at harbor connection with canal; (5) "railroad-controlled" elevators assessing all river-and-canal grain shipments with charges of 18c to 44c per ton at all loading, unloading and transfer points; (6) railway charges of 35c per ton on flour even to get flour from the mill on the river bank to the barge close at hand; (7) arbitrary influence of railway companies in diverting traffic, refusing co-operative connecting service, and by arbitrary pro-rates, joint-rates, switching and terminal charges taxing water traffic out of existence.

In regard to all of which it is sufficient to state, that railway companies have no lawful power at this time to impose such hostile conditions, and that the attempt at such exactions would render them liable to Government and State prosecution.

35. GOVERNMENT ADMINISTRATION OF WATERWAY AND CONNECTING RAILWAY:

Commercial success of the waterway in handling the inland traffic of Germany, Belgium, Holland, France and other European countries is due in large measure to an efficient and commercially scientific system of governmental administration. There the government which owns the waterway attends to its executive administration as a public business enterprise, just as our Government does with its post-offices and is preparing to do with the Panama Canal. The result is, that the canals and canalized rivers of these countries are kept in efficient condition for commerce; the relations between waterway and railway are placed on a co-operative basis with mutual and reciprocal benefit to each; the industries of the country are developed and given cheap and efficient access to the seaboard; while the commerce of the inland waterways has grown at a rate exceeding the rate of population growth and even slightly in excess of the growth of tonnage handled by rail. Grain is

today hauled a distance of 300 miles on the Rhine at one-fourth of the Iowa distance tariff rate by rail, and coal is hauled 200 miles at 48% of the Hocking coal district rate to the lake. (See 1912 report of National Waterways Commission, pp. 568-9.) The 100,000,000 tons of inland commerce hauled by the canals and canalized rivers of Germany demonstrate the value of effective administration by government, as well as the commercial potency of the inland waterway in developing the now greatest industrial power in Europe.

Among the features of such effective administration are:

(a) Grant of sufficient powers by Congress to an executive department to organize and administer the inland waterways of the United States as modern business enterprises in America and as waterways are successfully administered in the most successful foreign countries.

(b) Extend the powers of the Interstate Commerce Commission to cover waterways and joint river-and-water transportation, with complete control over interstate rates, pro-rates, joint-rates and terminal charges.

Measures looking to these ends are now before Congress, and doubtless will be in effect by the time the proposed project can be completed and placed in operation. This removes from necessity of present calculation the source of the chief obstacle to commercial feasibility, as advanced by the Local Board of Engineers with reference to the Lake Superior-Mississippi waterway project. Efficient governmental administration and governmental regulation of rates and terminal charges will eliminate the arbitrary and unreasonable terminal exactions by connecting railroads, which is the basis of the high cost of canal-and-river transportation as estimated in the Board's schedules, and will also provide for a system of co-operative effort between railway and waterway, which will develop the profitable commerce of both, together with the industries of the canal zone in the Lake Superior and Mississippi industrial region, as in Germany, Holland, Belgium, France and Austria-Hungary.

36. PUBLIC OWNERSHIP AND CONTROL OF TERMINALS:

Terminals largely control receipt and distribution of tonnage. The waterway being public property under public administration, it is essential to the commercial success of the enterprise, that the terminals likewise shall be publicly owned and controlled. Failure in this respect is admittedly the principal cause of the failure of many of the canals and Government waterway projects of this country in the past to secure and hold business. It is elemental that the success of any enterprise rests, primarily, upon the effective grant to the management of ample power to administer the controlling factors essential to the legitimate success of the enterprise. Certainly success is not possible when the controlling factors are in the hands of a competitor who is unfriendly to the success of the enterprise in question; as is the case when the docks, water frontage and terminal facilities upon which the waterway depends for traffic are in possession and control of a competing railway.

Public ownership and control of docks and other terminal waterway facilities is common in the countries of Europe, except Great Britain where waterways as a consequence have not met with complete success. Until recently, only the States of California and Louisiana in this country protected the rights of water carriers by public administration of waterway terminals. The past two years, however, have inaugurated a widespread movement for public ownership and control of docks, water frontage and terminal handling facilities at the principal harbors along our coasts and the movement has begun at interior ports. Among such harbor and inland port cities now building State and municipal docks and terminals for water-borne freight may be mentioned—New York, Boston, Philadelphia, Jacksonville, Pensacola, Mobile, New Orleans, Galveston, Houston, Los Angeles, San Diego, San Francisco, Oakland, Portland, Seattle, Chicago, St. Louis, Kansas City, Davenport and Minneapolis. Total bonds authorized for issue by States and municipalities for such public terminals ap-

proximate $200,000,000. Leading Canadian harbor cities are equally public spirited and enterprising in the cause of the development of their public water terminals and commerce.

The feature of this movement specifically germane to the project at hand is this: That such public terminals furnish the waterway with terminal facilities at cost, as a substitute for present arbitrary terminal exactions levied by competing private carriers. To-wit.—in place of the 25c and 35c terminal charge estimated by the Local Board of Engineers for transfer from lake barge to canal barge at Duluth-Superior and again for transfer at the St. Paul or Minneapolis terminal, such charge will be reduced by the public terminal to actual cost of handling, which is on the average 2c to 5c per ton.

COST OF HANDLING COAL.

The principal difficulty of the local board of engineers with reference to calculating the commercial feasibility of the Lake Superior and Mississippi River Canal project appears to have arisen in accepting the statements of those opposed to the project that the railroad terminal arbitrary charge of 25c per ton as the actual cost of handling the coal at the river terminal in the Twin Cities is 25c per ton, the cost of deterioration of one extra handling of the coal by clam shell, 25c per ton, and the cost of delivery from terminal in Twin Cities to coal yard or carload consumer 25c per ton. These arbitrary charges assumed to exist, load the coal traffic with 75c per ton tax and are sufficient to kill this project so far as carrying coal is concerned. We think the assumed charges are arbitrary and can be demonstrated to be erroneous. As hereafter shown, the coal can be handled at the river terminals from barge to dock or stock pile for a maximum of 3c per ton and from dock to railway car, including screenings, for a maximum of 10c per ton; that the diminution in value of coal by extra handling by clam shell from barge to dock or stock pile is so small as to amount to nothing at all and is fully offset by the shaking up of the coal when carried in a bumping box car from the lakes to the twin cities, a distance of from 150 to 170 miles. This item of alleged deterioration of coal is fully discussed

in the correspondence from the Bureau of Mines of the United States and the report of the Ohio Coal Commission later herein fully referred to and quoted from. The item of 25c per ton for delivery from river terminal to coal yard or carload consumer is equally non-existent. Only a very small percentage of the total coal consumed in the twin cities is delivered in carload lots on industrial tracks to actual carload consumers. As to such deliveries there would be a switching charge of $2.00 per car from river terminal to sidetrack amounting to 5c per ton. As to all other coal consumed in the twin cities the delivery would be direct from barge to stock pile situate right in the coal yard. Notwithstanding the statement of the local board to the contrary, there is ample room in each of the twin cities adjacent to the river banks for all the coal yards required to supply all coal consumed in the twin cities and they would be at once installed to take advantage of the lower rates afforded by the canal. Guaranty of installation of proper terminals and coal yards can and will be made by the commercial organizations and business men of the twin cities to the satisfaction of the general board. As to coal re-shipped by rail from Stillwater, Hastings and other Mississippi terminals and the twin cities, the rate would be covered by the new distance tariff law enacted in Minnesota in 1913 instead of the through rate from Duluth to interior points in Minnesota. So that the canal coal would not be prevented by discriminating rates in favor of railways from going forward to interior points. The cost of screening coal and loading cars at river terminals would not be greater than similar cost of loading cars at the docks at Duluth-Superior.

As these errors are vital to the question of commercial feasibility of the enterprise—and indeed of all other inland waterway projects—and are the principal factors in the failure of the Local Board to find this project commercially feasible, we have given this subject careful detailed study, have obtained the estimates of the engineers of the leading manufacturers installing coal-handling and other freight-handling plants in this country, and collected available data of leading Government and transportation authorities, of which the

following is a summary in outline:

(a) **Chief of Engineers, U. S. Army** (page 894, 1912 Report):

> "One large consumer transports coal by river a distance of about 50 miles at a cost of less than **10 cents a ton, including all charges,** while the corresponding railroad freight rate is 45 cents a ton."

As will be seen by subsequent testimony of the U. S. Engineers' Office at Pittsburg, hereafter appended, it was specifically understood that the phrase "including all charges" covered loading and unloading charges. Of course, it is apparent that a cost of less than 10c to cover transportation plus loading and unloading leaves only a small percentage of the Local Board estimate of 25c at each end of haul—possibly 2c or 3c per ton at each end—as actual cost of loading and unloading river barge.

(b) **Report of Lieut. Col. Mason M. Patrick, Corps of Engineers,** U. S. Army. (Page 6 of Statistical Report of Lake Commerce passing through Canals at Sault Ste. Marie, Michigan and Ontario, during Season of 1912):

Under the head of "Transportation charges, **including loading and unloading,** on freight passing through canals at Sault Ste. Marie, Michigan and Ontario, for the season of 1912," we find as the first tabulated item:

"Coal, short tons 14,931,594, rate per unit—30c."

It is apparent that with only 30c per ton as the lake boat cost of transportation, "including loading and unloading," from Lake Erie to Lake Superior, that again the actual cost of loading and unloading at the two ends of the route must be substantially less than the 25c at each end accepted by the Local Board.

(c) New York Harbor handles more coal than any other port on the globe. Coal destined for Manhattan Island, Long Island, Staten Island, and other parts of Greater New York, necessarily is delivered by water, the coal trains unloading at various points on the mainland at distances of two to twenty miles from the metropolitan docks, and brought to city wharves (sometimes by train floats), but usually in 500 to 600

ton barges. New York therefore, offers a prime object lesson of the commercial feasibility of water delivery of coal.

F. W. Saward, manager of the "Coal Trade Journal," a recognized coal trade authority of general and long standing in America, in a letter of Oct. 4, 1913, addressed to the writer (See Exhibit 5), estimates the total coal tonnage received at New York Harbor as approximating 40,000,000 tons per annum; and estimates cost of unloading from boats with modern machines as "of itself a small matter"—"amounting to 3c or 4c a ton."

(d) **Secretary of Commerce, HON. Wm. C. Redfield,** in a recent informal address before the convention of naval architects and marine engineers, gave the result of a statistical inquiry which he instituted to ascertain what percentage of the 30c per ton cost of transportation by lake from Lake Erie to Lake Superior represented cost of handling at the two ends. The net result of his inquiry, based on careful analysis of the various items of cost, was that approximately 6c represented cost of coal and ore handling at the two ends of the round trip, out of the 30c total. Detailed figures, doubtless may be obtained from Secretary Redfield.

(e) **C. W. Hunt Company, Inc., manufacturers of coal-handling machinery** at West New Brighton, New York, have furnished detailed estimates of cost of loading and unloading on and off barges at lake and river terminals, accompanied by blueprint sketches of various proposed types of loading and unloading plants suitable to the Lake Superior-Mississippi River canal-and-river project, as designed and prepared by Assistant Chief Engineer Fred E. Murphy, who rendered like service for this company in connection with the installation of the coal-handling plants of the General Government at the Isthmian Canal at Panama.

This company has furnished coal-handling machines for a large percentage of the U. S. Government and foreign government coaling stations, as well as for harbors on the Great Lakes, including Duluth-Superior.

Exhibit 6 attached contains specifications and blue-print sketches of four different types and capacity of coal-handling

plants recommended for use at various ports connected with the project.

Proposition 1 covers first cost and total operating cost of plant for unloading coal from lake barges and re-loading into canal barge, with capacity of 500 tons per hour, 5000 tons in 10-hour shift, and 800,000 tons in 160 ten-hour days; cost of handling per ton, including operating and fixed charges—2.715 cents.

Proposition 2 covers a small coal-handling plant for unloading and conveyance to storage at river and canal ports. The $8,000 plant unloads from river barge at the rate of 50 tons an hour and conveys to storage a distance of 500 feet from the stream at a cost of 3.93 cents per ton, including operating and fixed charges.

Proposition 3 is planned for a larger unloading river terminal, such as might serve a city of the size of St. Paul or Minneapolis. It unloads at the rate of 750 tons an hour, or 1,200,000 tons for the season of open navigation, conveying the coal on a 30-foot trestle a distance of 1,200 feet inland at a total unloading and transfer cost, including all operating and fixed charges, of 2.91 cents per ton.

Proposition 4 covers a more complex plant of 500 tons per hour capacity, which unloads from boats, transfers to storage pile, or to railroad cars, reclaims from storage pile, and reloads to cars or barges, at an unloading cost of 1.95c, at a transporting cost of 1.56c, and at a reclaiming cost of 2.87c, or, combining all of these various operations, which would be necessary in case of ultimate delivery of coal by rail, at a total of 6.38c, covering all operating and fixed charges.

As touching the point of damage to coal in handling, Engineer Murphy reports that the percentage of damage as handled by these plants will be very small, and that in the case of steam boiler coal the breaking is of no disadvantage, because "it is necessary to crush run-of-mine coal before it can be economically fired by automatic stokers."

It will be noted, in the above, that the plant and cost of operation for transfer of coal from lake barge to canal barge, or unloading from river to dock, is much more simple and less

expensive, than in case of storage and transfer to railroad trains.

Applying Plants 1 and 3 to Duluth-Minneapolis haul of 262 miles by canal and river, total charges are: Lake handling, 2.715c; haul at 1.5 mills per ton-mile, 39.3c; unloading and delivery in storage 1,200 feet from river, 2.91c—total, 44.925c, against 90c to $1.25 by rail.

(f) **The Brown Hoisting Machinery Company,** manufacturers of coal and ore handling machinery, main works at Cleveland, Ohio, with New York, Pittsburgh, Chicago and San Francisco branches, and among the leading companies installing coal and ore handling plants on the Great Lakes, including Duluth-Superior Harbor, submit catalogues and photographs of plants, and offer to furnish detailed data. The New York manager, in letter of Oct. 23, 1913, (Exhibit 7) says of unloading cost:

> "In reference to cost of unloading, this depends upon the circumstances under which the unloading is done; that is, whether the coal is simply brought to a bin on the edge of the dock, or carried back to a stock-pile. It also depends somewhat on the vessel, as to the size of the hatches and convenience of getting at the coal. We would say that this cost would be **from 2c to 5c a ton,** and in some cases may exceed this price of 5c."

Inasmuch as in unloading from lake boat into pocket at the edge of the deck for transfer by chute into canal boat at the foot of the pocket would entail the minimum of distance and labor of machine in transfer; whereas unloading for transfer to stockpiles on shore and reloading upon trains entails a maximum of distance and labor of handling machinery —the cost of 2c per ton would likely apply to use of canal boat, while the 5c or over would apply to rail transportation.

(g) **The McMyler Interstate Company,** Cleveland, Ohio, manufacturers of ore and coal handling machinery, orange peel, clam shell and scraper buckets, car dumpers and locomotive cranes, also one of leading manufacturers of such machinery at Great Lakes and ocean harbors, submit (See Exhibit 8) photograph and estimate of unloading cost for

plant suitable for unloading from lake vessel to canal barge, and from canal barge to dock at canal or river terminals, and state:

> "We estimate that cost of unloading under these conditions should not exceed **two cents (2c) per ton for labor, fuel and repairs.** This does not include interest on first cost of machinery and wharf."

If 1c per ton be added for fixed charge on plant, the total would reach 3c per ton, as against 25c arbitrarily used by Local Board.

(h) **Mead-Morrison Manufacturing Company, New York,** recognized as among leading corporations engaged in manufacture and installation of coal handling and hoisting machinery, submitted estimates (See Exhibit 9), catalogues and photographs of plants installed by them at Duluth-Superior and other leading ports.

On the proposition of a large coal unloading and storage plant at Duluth-Superior, similar to those now installed for lake-to-rail transportation, with capacity of 1,000 tons per hour and 1,000,000 tons per season, and 500,000 tons storage capacity, total plant to cost $1,000,000—labor and fuel cost 3c per ton, and interest, depreciation and repairs raise this to 7c to 12c, according to tonnage handled. The above approximates the cost involved in transportation by rail, without giving the railroad company dividends on capital outlay.

Similar cost per ton is estimated for plant with storage capacity at Minneapolis and St. Paul terminal.

Unloading from canal barge with $7,000 plant at river dock is estimated at 4c per ton.

(i) **Link-Belt Company,** which has extensive manufacturing plants at Philadelphia, Chicago and Indianapolis, and sales offices at 16 cities, of which Minneapolis in proposed canal zone is one, furnished catalogues descriptive of large variety of coal, coke, ore, cement, sand and stone carriers, unloaders, tipples, and general link-belt conveyor machinery, such as are used in mines, mills, power stations and harbors throughout the country, including plants in operation in St. Paul, Minneapolis, and other cities in canal zone.

In informal conversation, New York manager estimated cost of handling at 3c to 5c for such conditions as those involved in unloading and loading coal and other bulk commodities at ports of Lake Superior-Mississippi River transportation project, with due increase in ultimate ton cost for extended conveyance through storage and manufacturing plants.

(j) **New York Edison Power Company,** said to be largest single consumer of coal in New York City, with annual consumption estimated at 750,000 tons, unloads coal from 500-ton river barge, hoists it to a height of 180 feet, crushes it for automatic stoker, weighs coal and conveys it by cable car to storage bins in upper floors of power station for gravity stoking, at a labor and power cost estimated by Chief Mechanical Engineer Grady of 2c per ton, and of about 4c including fixed charges.

Estimates of engineers for large power plants generally in New York approximate 3c per ton for operating cost and 4c to 5c including interest, depreciation and repairs. These plants are necessarily more elaborate and expensive, both in first cost and in operating cost per ton than plants required for loading and unloading canal and river boats on Lake Superior-Mississippi River project.

(k) **Superintendent of Ferries, City of New York:**

The Department of Docks and Ferries for the municipality of New York has a coal handling plant (See Exhibit 10) with 1-ton clam shell bucket which hoists coal from 600 and 800-ton barges a distance of 80 feet, weighs coal and discharges it into a pivoted bucket conveyor which travels 150 feet in distributing coal in bunkers. The plant is not operated on commercial basis, because the city demand of 65,000 tons for ferries requires use of plant for only partial capacity. The Superintendent of Ferries (Ex. 10) estimates present handling cost at 5.3c per ton, which interest and depreciation on investment would increase to 8.4c. By operating plant at full 8-hour day, the Superintendent estimates reduction of **ton cost of handling to 4.1c.**

(1) **United States Engineer Office, Pittsburg, Pennsylvania,** furnishes the record for the lowest cost of coal handling from river barge or otherwise. In statement prepared by Assistant Engineer Thos. P. Roberts, who has for many years served as local engineer in charge of Locks and Dams Nos. 1 to 6 on Monongahela, including Pittsburg Harbor, and herewith gives data (See Exhibit 3) supplied to the Engineers Office at Pittsburg by companies handling coal from river barges at that point. Says Engineer Thomas (Sec. 4 of Exhibit 3):

> "We have on the Monongahela, in Pool No. 1, a double ladder coal dredge **unloading 500 tons per hour, raising it about 70 feet, and transferring the coal by an endless belt several hundred yards to the cars which distribute the coal to the coke ovens for a cost of one quarter of a cent per ton.** This is only about one-twelfth the cost of simply raising the coal with a clam shell to the height of 70 feet."

Presumably this ¼c covers cost of operation only, and does not include interest and depreciation. Subsequent data procured by Engineer Thomas (See Exhibit 3) shows that the cost of the Monongahela plant named is $40,000, and that its capacity is 600 tons per hour. If we assume that interest, depreciation and repairs on such plant would reach 15%, or $6,000 a year, and that the plant runs at 500 tons capacity per hour, 8 hours daily for 200 days in a year, handling 800,000 tons annually, the fixed charge would be ¾c per ton, making **1c per ton as total cost of unloading from river barge, hoisting 70 feet, and transferring to coke ovens several hundred yards distant from stream.**

There is little question that the Monongahela River and Pittsburg Harbor, where coal handling has been specialized by long experience at the hands of large industrial companies, the rate of coal handling cost has been reduced to the minimum and is lower than can be expected at docks of proposed Lake Superior-Mississippi River lake and river terminals for many years. Handling cost of 3c to 5c per ton is, however, a reasonable average for which there is general consensus

of authority; and on this basis the commercial feasibility of coal handling by canal and river on said project is amply assured, as compared with admitted cost by rail.

38. DATA SHOWING LOW COST OF COAL HANDLING AS GIVEN BY LOCAL BOARD:

Above data with reference to record low cost of coal handling from Monongahela River barge to coke ovens as contained in Exhibits 3 and 4 is forwarded to the Minnesota Commission from the U. S. Engineers Office at Pittsburg.

Said Local Board also furnishes direct official data of cost of coal handling from boat to dock at Duluth-Superior Harbor in Appendix "C" of their report, being data contributed by J. A. Little, City Statistician of the City of Superior, in the harbor of which the canal will have its northern terminus. This statement of fact by Mr. Little loses none of its force by reason of his position in trying to prove that West Virginia coal cannot be profitably delivered in St. Paul via the lakes.

By way of verification of Statistician Little's figures, to make certain that they are not the result of typographical error, I quote his calculation of cost from West Virginia mine to St. Paul, as follows:

> "Mine cost 86c, plus transportation expenses of $2.00 through Superior to St. Paul, makes West Virginia coal worth $2.86 per ton, plus cost of handling at Superior-Duluth docks (3c ton boat to dock, plus 10c from dock to car). 13c would mean a total cost of $2.99 a ton at St. Paul."

So far as Mr. Little's theory is concerned, it is disproved by the actual tonnage of lake coal which has given the Twin Cities its chief fuel supply for years and is yearly increasing —the net increase being about 50% in five years. But as regards the handling cost in question, Mr. Little's figures are vitally pertinent, not only because of the stated cost of 3c per ton from boat to dock, but by reason of the collateral fact, that the cost of handling from **dock to car is 10c,** making **13c as boat-to-rail cost, against 3c when the rail transfer is omitted.**

39. DETERIORATION IN MARKET VALUE OF COAL INVOLVED IN ONE EXTRA HANDLING OF COAL BY CLAM SHELL OR OTHER LIKE MEANS.

The local board of engineers has assumed, from statements made to it by coal dealers at the head of the lakes, that one extra handling of coal causes a deterioration in the market value of the coal of twenty-five cents per ton. No reliable authority or evidence of any tests is quoted to sustain such statement. Counsel for the Minnesota Commission has made very extensive inquiry of the coal mining companies of West Virginia, Maryland, Pennsylvania, and of the United States Bureau of Mines and the Department of Mines of several states on this subject. The coal mining companies have not responded to the inquiries and have referred counsel to the president of the Northwestern Fuel Company for the information in question. So far no information has been received through the coal mining companies or large dealers in coal.

From letters received from the United States Bureau of Mines it appears that there is no authority for the statement that deterioration amounts to twenty-five cents per ton, or any given sum. Owing to the prominence that has been given to this charge, we quote from the letters of the Bureau of Mines as follows:

> "The bureau is not aware that any definite measurements have ever been made to determine the amount of deterioration in the market value due to handling bituminous coal between the eastern coal fields and the upper lake region. In fact information on the deterioration of bituminous coal between mine and user is very meager.
>
> This is probably due to the difficulty and great expense in making an investigation of this sort. To give a proper reply would require that the coal in a large quantity, such as a cargo of 6,000 tons, should be followed from the face in the mine to the boiler room of the user, and at each new handling the whole product should be sized through screens and returned to its original mixed condition. This operation of screening the coal in order to find the relative proportions of each size

would in itself damage the coal in a manner unusual in practice and would therefore give unreliable values for subsequent handlings. The coal is shoveled into cars at the face in the mine, is dumped from cars at the tipple, drops from the tipple into railroad cars, is handled from railroad cars into pier cars at the loading docks; from the pier cars it drops into coal pockets; from the coal pockets it drops into boats; from the boats it is reclaimed by buckets, dropped from buckets either into cars or stock piles; drops from stock piles into railroad cars; drops from railroad cars into local storage piles, is shoveled from local piles into boiler room cars, and is rehandled in the boiler room.

This operation makes at least twelve handlings and in some cases several more are added. It is rare that every one of these operations is conducted in the best possible manner to reduce breakage. In fact, the question of breakage in handling devices is by no means the first consideration. Any careful investigation of this subject, therefore, would require the handling of a great many tons both before and after each operation.

Some such work has been done in some of the operations with hard coal which stands screening much better than soft coal, but even in this case the fine material is not returned to the original mass where it would have an effect on succeeding operations. Having separated our soft coal into the several sizes in order to determine the degradation of sizes, it would be extremely difficult to recombine the several amounts so that their effect on subsequent handlings would be normal.

The problem is further complicated by the considerable difference in the strength between different coals, some coals standing considerable more abuse in handling than other coals. If the coal is stocked in piles through the winter at upper lake ports, the freezing and thawing adds another large and variable factor to the problem.

Even if it were possible to express in figures the degradation in size, it would be yet more difficult to state what the deterioration in market value was. The mere fact that coal which starts from the mine as good lump coal finally reaches its destination with a considerable proportion of fine material in it, would not warrant the buyer in assuming that the value of the fine stuff was that of slack. Slack coal at the mine contains a larger per cent of ash and impurities than the lump coal, while

the fine stuff made from the breakage of lump coal has a heating value equal to the original lump coal. Whether this heating value can be efficiently realized in practice depends entirely upon the equipment of the boiler plant where it is used; that is to say if all plants at upper lake ports were equipped to efficiently use fine crushed bituminous coal, such as is used in many stoker equipments, there would be no deterioration in the market value due to breakage of the coal in transit.

Very truly yours,

J. A. HOLMES,
Director."

"The Bureau is unable to furnish any information on the subject of deterioration of coal in handling other than that contained in its letter of March 11th.

It may be pointed out that coal as usually handled has passed through some twelve or more operations, and if each of these operations reduced the value of the coal 25c per ton it is readily seen that the price at destination would be something less than nothing. It is hardly to be supposed, therefore, that the addition of one more handling from lake bottom into coal barges would deteriorate the value as much as 25c per ton."

A great deal of light is thrown upon this question by the report of the Ohio Coal Commission to the Governor of the State of Ohio, dated December 17, 1913. One of the main questions considered by that Commission was the question of whether miners of the State of Ohio should be paid on the "mine run system" or whether the system of paying miners for the amount of coal which would pass over 1¼-in. screen should be continued. In the consideration of that question the Commission made investigations and took testimony, not only at the mines and as to the conditions of mining but as to the operations involved in the handling of coal from the face of the mine to the consumer, and among other things took testimony of expert coal men familiar with conditions at the head of the lakes and entire northwest with reference to lump coal, slack and the conditions which produced slack or fine coal. If the Board will read pages 43 to 50 of the report of the Ohio Commission, it will inevitably conclude that

if the coal is properly mined in the first instance, that is, if it is not "over shot" but is undercut by machinery and shot with a proper charge of powder, the liability of the breakage of the coal in handling is reduced to a minimum; but any of the Ohio, Pennsylvania or West Virginia coal which is over shot or blasted with too heavy a charge of powder will produce a large percentage of slack in the various handling operations to which it is necessarily subject in being taken from the mine to the consumer.

It appears from the report of the local board, as well as from the testimony taken by the Ohio Commission, that when the coal is received at the docks at Duluth-Superior it is screened before being stored or shipped by car, and **in all probability the twenty-five cent per ton** deterioration mentioned in the report of the local board is the deterioration due to **the entire process of carrying the coal from the face of the mine to the dock,** involving, as it does, **from a half a dozen to ten handling operations**. There is nothing in the report of the local board or any of the evidence or statements received by the board which indicates that the one extra handling involved in transportation of coal by canal barge, which handling occurs before the coal is screened, should have any more effect on the deterioration of the coal than any one of the other handlings of the coal necessarily involved in transporting the coal from the mine to consumer. The conclusion seems to be inevitable that the assumed deterioration does not exist and that the deterioration, if any, is so slight as to be commercially negligible and is fully offset by box car transportation from Duluth to the Twin Cities.

40. COAL PRINCIPAL COMMODITY OF WATERWAYS AND CANAL.

In the United States and Europe coal is one of the principal commodities transported on canals and waterways. On page 532 of the final report of the National Waterways Commission it is said:

> "The foregoing analysis of the traffic carried on the principal waterways of Europe and the United States re-

veals the fact that a few bulky commodities form the great share of the tonnage. Among these, coal is the most conspicuous. In many cases it furnishes more than 50% of the total traffic, and sometimes as high as 90 or 95 per cent. The cases are rare on the principal waterways where coal is not the largest single item carried."

Water rates on coal are usually the lowest of any commodity. We quote from the above authority on page 556:

"The average charge for the transportation of coal on the Rhine from Ruhrort to Mannheim, a distance of about 220 miles by water, for the nine year period 1901-1909, was 27.6 cents per metric ton. The lowest charge recorded during this period was 13.1 cents, which was made on a few consignments in 1908, and the highest charge was 58.8 cents, which was reached in the same year. The average yearly rate on this coal traffic was lowest in 1909, when it reached 18.3 cents per metric ton. This was due to a large increase in the number of boats competing for the traffic, which more than offset the considerable increase in the traffic itself.

"The following table shows the average rates recorded for carrying coal during the last decade from the mouth of the Ruhr to Mannheim:

Year.	Marks. Per ton.	Cents. Per ton.	Year.	Marks. Per ton.	Cents. Per ton.
1901	1.05	24.9	1906	1.45	34.5
1902	1.00	23.8	1907	1.61	38.3
1903	1.18	28.1	1908	1.10	26.1
1904	1.23	29.2	1909	.77	18.3
1905	1.08	25.7			

The above figures are for metric tons of 2240 pounds. Reduced to a ton mile basis they are as follows:

Cents per ton.	Mills per metric ton mile.	Mills per ton mile 2000 lbs.
27.6	1.25	1.23
13.1	.059	.053
24.9	1.13	1.11
18.3	.083	.074
23.8	1.08	1.07
28.1	1.27	1.25
29.2	1.32	1.30
25.7	1.16	1.14

41. TRAFFIC FINDING A: CANAL WILL CARRY COAL.

Coal takes a transportation rate 25 % less than average freight tonnage. Accepting Erie Canal standard of 2 mills per ton-mile as average freight, the coal rate should be 1.5 mills per ton-mile. Coal has actually been carried on Erie and Hudson 500 miles between New York and Buffalo, and that in 240-ton canal boats sometimes carrying only 160 tons per load, according to testimony of booking agencies, at 45c for trip, or .9 of 1 mill per ton-mile. On Monongahela, Allegheny, Kanawha and Ohio, the average rate in 500-ton barges appears to be not much over 1 mill per ton-mile. The rate on the Alabama project is 2.5 mill per ton-mile. To assume as a coal rate on Lake Superior-Mississippi River waterway by use of 550-ton barges **1.5 mills per ton-mile** would therefore appear reasonable in light of practical experience on above named 6-foot navigable waterways.

Transfer from lake barge to canal barge via pocket bins—upper mouth of pocket being at edge of deck of lake vessel, and foot of pocket terminating in retarding chute which loads canal barge—affords the cheapest and simplest method conceivable of unloading lake vessel, and should cost, on basis of Pittsburg and Great Lakes experience, not over **2c to 3c per ton**. Lake vessels need not wait for canal barges, but unload into pockets at pleasure and at all hours of day; canal barges being likewise independent of movements of lake vessels, except that canal barges must relieve harbor pockets within a reasonable number of hours.

Unloading at river terminals probably cannot be accomplished at 1 cent per ton rate achieved at Pittsburg, but may **reasonably approximate 3c**, which should convey coal to cable line or storage bunker several hundred feet from river bank.

This will make cost of transportation by canal and river 250 miles from Duluth to Minneapolis, taking from lake barge and delivering in Minneapolis storage near river-front, at approximately 45c per ton for transportation and handling at both ends of route. One authority, Mr. Banhard, reduces this to 25c per ton.

As against 90c by rail on soft coal the saving by waterway would be at least 45c per ton; and as against $1.25 by rail on hard coal the saving would reach at least 80c per ton.

Compared with Illinois rail rates of $1.40 to $2.10 from mines or from Chicago to Twin Cities, the Duluth-Superior coal moved by canal and river would have the superiority of 95c to $1.65 in transportation cost, besides the marked superiority in grade of lake coal.

Present consumption of Minneapolis, St. Paul, Minnesota Transfer and South St. Paul approximates from 2,500,000 to 3,000,000 tons. Other canal and river cities and counties in Western Wisconsin and in Eastern, Central and Southern Minnesota, will consume and distribute to country tributary at least 1,500,000 tons additional, making present coal total for canal zone and territory tributary to Mississippi River distributing centers about 4,000,000 tons. Increased coal demand of territory and coal capacity of Duluth-Superior harbor during estimated four-year period of building canal will expand coal tonnage available to Upper Mississippi via lakes to not less than 5,000,000 tons. Allowing railroads to haul from Duluth-Superior all of their present tonnage, with some annual increase, there will still be upwards of 2,000,000 tons available to canal-and-river barges, at a saving of 45c to 80c on lake-and-rail rates, and much more than that margin as compared with all-rail rates from Chicago and Illinois mines.

If the average ton saving on the total 2,000,000 tons carried by waterway is 50c per ton, the total amount saved in hauling coal is $1,000,000 per annum, which is $580,000 more than the $420,000 required by the Local Board of Engineers to demonstrate the commercial feasibility of the project.

42. TRAFFIC FINDING B: CANAL WILL CARRY STEEL, CEMENT AND MERCHANDISE.

Investment of an ultimate total of $25,000,000 in model steel, blast furnace, coking and cement industry by U. S. Steel Corporation at Duluth is for the evident supply of the Upper Mississippi Valley and westward territory by that company of its various productions. Its Gary and South Chicago plants

take care of the Middle West and the lower Mississippi Valley; which leaves Minnesota, western Wisconsin, the Dakotas and northern Iowa and Nebraska to be taken care of by the Duluth plant. Over one-half of the proposed 48 mills, ovens, furnaces and auxiliary buildings are now approximately completed, and foundations are laid for the remainder, upon which a large force of mechanics are putting up the superstructures and installing machinery. The furnaces are ready for business, and a year will find the plant at least in partial operation.

Slag containing lime refuse from the furnaces is converted into cement. The furnaces and cement works require large quantities of limestone, of which the limestone formations through which the Upper Mississippi and lower St. Croix makes channels have an abundant supply.

Annual tonnage of the Minnesota Steel Company works at Duluth can only be roughly estimated at this time. It is conservative to say that the rail mills, merchant mills, structural steel mills, furnaces and rolling mills will ship 500,000 tons of their products per annum into the Mississippi Valley; probably 1,000,000 tons may eventually be the annual shipment. Duluth works will supply the various manufacturing subsidiaries of the Steel Corporation, such as the American Bridge Company at Minneapolis and St. Paul, with structural steel, and other down-river points. The American Bridge Company is likewise a builder of river barges and steel tow vessels, and will undoubtedly be in the market for canal and river equipment generally.

As a builder of river and canal barges, it is natural that the Steel Corporation should use such equipment for its transportation purposes, as the company is doing both on the Monongahela and the Great Lakes. The Steel Corporation owns a fleet of 114 of the largest carriers on the Lakes and is using its own barges on the Monongahela and Ohio for handling its coal, iron and steel. Along its two miles of water-front on Duluth-Superior Harbor it is now building additional docks; and these could well serve to load canal and river boats for transportation of products through proposed canal link into the Mississippi.

It is therefore fairly reasonable to suppose that Duluth-

Superior will ship via the canal a tonnage of 500,000 or more of steel and cement.

GENERAL MERCHANDISE.

The purpose of New York City, through the New York Produce Exchange and Chamber of Commerce, representing the merchants, manufacturers, grain and produce interests of that metropolis, in supporting the measure for a $130,000,000 Erie Barge Canal and public terminals, is:

First to secure and hold for New York harbor the grain, flour and general produce of the Northwest, including the Upper Mississippi Valley and Lake Superior region.

Second, to furnish the Erie Canal barge fleets with return cargoes of general merchandise from New York and the Atlantic Coast, including foreign imports.

There is no question of the power of a largely improved and efficiently administered Erie Barge Canal with well equipped public terminals to develop a channel of commerce with the Great Lakes region. That is shown by the former achievements of the old Erie Canal, to which is attributed much of the vantage ground of New York Harbor over Boston and Philadelphia in the race for position of chief emporium of the Atlantic Coast.

As the largest share of the grain, flour, and general farm produce which New York invites will come from Duluth-Superior, the outlet of the agricultural shipments of Minnesota, north and South Dakota, and northern Iowa and Nebraska, it is inevitable that the return cargoes of merchandise will seek Duluth-Superior Harbor for trans-shipment into the Upper Mississippi Valley.

As shown by Exhibit 13 attached hereto, canal-and-lake rates over the "Anchor Line" from New York to Duluth-Superior, even with the present neglected equipment on the Erie, are about 25% under the lake-and-rail rates. New York Canal authorities report that the new 2,000 and 3,000 ton barges on the enlarged Erie Canal will reduce the average ton-mile rate from the present 2 mills to one-half mill per ton mile. This marked reduction in transportation cost is bound to have its

influence on volume of commerce handling. It means largely increased tonnage for Duluth-Superior Harbor.

Moreover, American grain will soon cease to be exported to Europe, because the American production is required for American consumption. That means that the grain and flour now going to Montreal for export will go to the chief centers of domestic consumption, and as it takes the Great Lakes route for cheap transit this tonnage will naturally proceed via the new Erie Barge Canal to New York for Eastern distribution.

The result is the development via the lakes and canal of an extensive waterway commerce between New York Harbor and Duluth-Superior; and hence a substantial merchandise tonnage via the Lake Superior-Mississippi River canal with the Upper Mississippi valley.

Such hevy commodities as salt, sugar, cement, iron and steel, machinery, and likewise such staples as heavy cotton goods for Twin City manufacture into farm, mill, mine and lumber clothing supplies, which now take the Great Lake route, will use the proposed canal-and-river line in largely increased volume. The New York through west-bound merchandise tonnage plus that developed by the big steel plant at Duluth should give the canal by the time it is finished an aggregate available freight of 1,000,000 tons.

43. ECONOMIES ON THROUGH WESTBOUND AND LAKE SOUTHBOUND TONNAGE:

On through westbound merchandise from New York Harbor via Erie Barge Canal, Great Lakes, and Lake Superior-Mississippi River Canal, there will be the following economies in cost of transportation and freight handling:

(a) Public terminals and freight handling machinery provided by the State of New York, now being designed and installed, will reduce present rail terminal charges of 25c to 50c per ton at New York to actual cost of handling from dock to barge of about 3c per ton.

(b) Rail to lake rate of about 7 mills per ton mile on carload lots from New York to Buffalo will be reduced by new

Erie Barge Canal to less than 1 mill per ton mile.

(c) Freight handling of such merchandise at Duluth-Superior which costs through rail terminals 25c to 35c can be transferred from lake vessel to canal barge via modern terminal plant suitable to dock practice at 3c to 6c per ton.

(d) Transportation via canal and river to river terminals on Mississippi will be at 2 mills per ton mile, compared with rail rate of 6 mills or more.

(e) Delivery of freight from barge to dock and terminal warehouse at Minneapolis, St. Paul, and other river points can be made with modern gantry, telpher, and other freight handling machinery at 3c to 6c per ton, according to distance of carriage and mode of storage; in lieu of the rail terminal cost 25c and upwards.

The above economies are not net, because the rail rate may include part of the terminal costs. The differences in actual cost to carriers, however, are taxed upon the consumer in one or another method in the end. Conversely, economies in actual cost of transportation and handling redound to the benefit of the consumer in the final analysis. Reductions in such cost by water route enable the waterway to secure and hold traffic. Restricting the saving by canal to 42c per ton as follows—52c for Duluth-Minneapolis haul at 2 mills per ton-mile, plus 4c handling charges at lake and 4c at river dock, total water line, 60c, compared with rail average of $1.02—would net on 1,000,000 tons the necessary $420,000 estimated by Engineers as justifying the project.

44. TRAFFIC FINDING C: CANAL WILL CARRY EASTBOUND FLOUR.

Through-merchandise from Great Lakes route and tonnage originating in Duluth-Superior Harbor, other than coal, will move on the canal and river in decked barges suitable for return eastbound cargoes of flour.

Merchants and millers at Minneapolis, St. Paul, South St. Paul, Stillwater, Hastings, Red Wing and Winona may unite, as have those at Kansas City, in the orginazation of a canal-and-river navigation company for the operation and handling

of their own freight line. In that case, barges coming from the lakes with merchandise would return to lakes with flour eastbound.

Minneapolis now produces 18,000,000 barrels of flour, which is more than that of any other milling center in the world. This flour production will annually increase; by 1918 it will be 20,000,000 barrels. Other mills in canal and river territory will swell the total to somewhere near 30,000,000 barrels, or 3,000,000 tons. Via the river, the canal link, the lakes and the Erie Barge Canal and New York public terminals, this flour tonnage can go to New York harbor at much less than the rail rate to Chicago, and at less than one-half the all-rail rate to Atlantic.

The Local Board of Engineers apprehended, that to deliver this flour from mill to river barge would entail a terminal rail handling cost of 35c per ton, which would practically wipe out the margain of reduced cost of water transportation to the lake. However, it appears that such terminal rail handling is unnecessary.

The American Steel and Wire Company, which at the Trenton Iron Works manufactures air cable lines, or aerial tramways, under German patents, furnishes specifications (See Exhibit 13) for a cable plant that will take the flour from the Minneapolis mills on the river banks, carry it down river a half-mile or more and deposit it in a barge at a cost of 3.6 cents per ton, including all operating and fixed charges.

About 4,000 of such plants are now in successful operation, engaged to handle similar situations, where engineering difficulties and rail costs are prohibitive by ordinary transportation methods. One of such plants has been in successful operation between the mill and elevator of one of the big milling companies of Minneapolis for several years.

At Duluth-Superior Harbor a belt-conveyor will transfer the flour from canal barge to lake vessel at similar cost.

Allowing 4c for loading and unloading by modern machinery at river and the same at the lake, or 8c, plus 2 mills per ton-mile Minneapolis to Duluth-Superior, 52c makes 60c by

barge compared with average $1.02 by box-car, a saving of 42c per ton. This economy applied to 1,000,000 tons of flour, being only one-third of the total flour tonnage, would produce the total $420,000 economy necessary to justify the project.

45. TRAFFIC FINDING D: CANAL WILL CARRY NORTH AND EAST BOUND GRAIN:

Grain from Duluth-Superior Harbor goes by lake to Montreal and is loaded on ocean vessels by floating elevators at a total of 4½c per bushel, from Minnesota and Wisconsin harbor to ocean liner.

The New York Produce Exchange is preparing to duplicate this charge via Erie Barge Canal. Harbor loading charge on ocean vessel in New York is now one-half cent per bushel.

From Minneapolis and other primary and local grain markets to Duluth-Superior wheat moves at 3c per bushel, or $1.00 per ton, by rail, as compared with one-half that ton-mile rate in 240-ton barges on the old Erie Canal—a saving of 50c a ton.

Surplus grain in Minneapolis, St. Paul, Stillwater, Red Wing and Winona elevators, over and above local milling demands, with similar elevator charges by rail and water, will take by preference the 5c water rate as compared with $1.00 rail rate.

Elevators will adapt their locations and terminal arrangements, so far as new plants are concerned for additional tonnage, to waterway transportation; and in the absence of such changes by line elevator companies, co-operative farmers' elevators will take advantage of the low transportation cost by water to handle their products as now frequently occurs even along the railroads.

At river points where elevators are not available, grain will flow by chute or move in cable buckets from overhead tracks to barge at 2c to 5c per ton.

Floating elevators, or belt-line conveyors, will transfer grain from barge to lake vessel at materially less than the usual elevator charge.

Local Board of Engineers fears that Chicago rail route may get coarse grain in Minnesota and Western Wisconsin even

on a rail charge of $2.50 per ton from La Crosse to Chicago. Their difficulty lies (1) in loading the water route with 44.4c per ton loading charge at LaCrosse and 44.4c more for unloading at Duluth-Superior, and (2) in hauling the grain around from Lake Superior through Lake Michigan to Chicago (a route it would not take), when the same cost of lake transportation would deliver it in Erie barges at Buffalo, destined to New York, where it is worth 6c to 8c per bushel, or $2.50 to $3.00 per ton, more than it is at Chicago.

Granting that all grain raised north and west of a straight line from southwestern Minnesota to Duluth and tributary to said line would take the through rail route to Duluth, there remain a large group of Minnesota counties in eastern, central and southern Minnesota, besides a double tier of western Wisconsin river and canal counties, and likewise a further group of grain-producing counties in northern and northeastern Iowa. The total grain production of this region approximates 240,000,000 bushels. Assume that two-thirds of this total product of wheat, corn, oats, rye, flax, buckwheat and barley is required for home, mill and live stock consumption. There remain, reduced to tons, 2,000,000 of surplus grain tonnage for river and lake, or for Chicago rail shipment. This grain is either tributary to the Mississippi, or must cross that stream, to get to Chicago. The central point of this tonnage territory, where it crosses the river is about equidistant, say 300 miles, from both Chicago and Duluth-Superior.

The Engineers give $2.50 per ton as the rail charge to Chicago.

The Erie rate of 2 mills per ton mile for 300 miles is 60c.

Will the grain go via Duluth-Superior and the lakes to New York, where it can make the entire water trip to New York Harbor for a ton rate equal to the rail rate to Chicago; or, will it go to Chicago and be worth to the shipper 6c to 8c per bushel less than it is in New York?

Even granting that the water route entails two transfer charges of one-half cent per bushel at each transfer, the advantage to the shipper is 5c per bushel in favor of the water route.

If the river divided this surplus tonnage with the rail route, the margin of saving on 1,000,000 tons would alone more than produce the $420,000 a year necessary to demonstrate the commercial feasibility of the river and canal improvement.

46. TRAFFIC FINDING E: CANAL WILL CARRY NORTHBOUND COMMODITIES.

Besides grain and flour, the river and canal will carry sundry northbound commodities from Mississippi Valley to Great Lakes:

Limestone from limestone ledges which form river banks of Upper Mississippi and St. Croix.

Building stone from stone quarries that will develop among the hills bounding the St. Croix.

Brick from numerous brickyards on St. Croix and upper Mississippi.

Tile from Red Wing and other tile works on rivers for drainage of swamp sections on upper Wisconsin and Minnesota rivers and in lowlands suitable for truck farming.

Commercial fertilizers from South St. Paul packing houses, which will find its best market in market gardening districts of lower lakes and in New York and New England.

Oil cake from the Twin City Linseed Oil mills for export and for Eastern Consumption; the Twin Cities being leading linseed oil and cake manufacturing district of the world.

Potatoes from sandy farm land section of eastern Minnesota and western Wisconsin for Great Lakes and Duluth-Superior steel mill and iron mine districts.

Bran, shorts and general mill feed for Ontario, lower lakes and eastern dairy regions.

Hay from meadow sections of St. Croix Valley, baled for Great Lakes cities and for dairy and livestock districts.

Agricultural implements from Minneapolis-St. Paul implement houses, which carry the largest implement business of any distributing center in the world.

Binder twine and farm machinery from Minnesota State Prison at Stillwater, which is one of the largest plants in that

line of goods and operated by the State to give farming sections low-priced and reliable wares.

Hardwood and pulpwood lumber from St. Croix wooded region for Eastern consumption.

These staple commodities in the aggregate will make a heavy and dependable tonnage local to the river and canal, and a little subject to general rail competition over the route from origin to destination of the respective shipments. There should be never less than 1,000,000 tons per annum in the aggregate of these commodities available to the river and canal route. Development of the waterway will in itself develop these industries.

These miscellaneous heavy commodities will furnish return cargoes to the lake for the open coal barges which will supply the Twin Cities and all other Upper Mississippi manufacturing and large population centers with fuel, cheaper coal will stimulate manufacturing enterprises resulting in increased commerce. This tonnage gives the Lake Superior-Mississippi River project a marked advantage over the Monongahela and Allegheny, which have no return cargoes for their coal boats. As a consequence, transportation cost on these Pennsylvania coal-carrying streams has to include the round trip with return of empties, with no earnings for the return voyage; where as the Lake Superior-Mississippi barges will have revenue freight both ways.

With coal barges southbound from lake, and above named commodities for northbound fleets, an average of 1.5 mills per ton-mile will be assured each way, as compared with 6 to 7 mills by rail. A saving of 4 to 5 mills per ton-mile on an average 200-mile haul on 1,000,000 tons would insure the commercial feasibility of the project from every point of view, regardless of all other classes of tonnage available.

47. TRAFFIC FINDING F: CANAL WILL CARRY THROUGH COMMERCE LAKES-TO-GULF AND NORTH-AND-SOUTH AND VIA PANAMA:

Because of diversity of climate, seasons, people and productions, nature and the laws of supply and demand in-

tended commerce between North and South, between north temperate zone and tropics. A century of slavery followed by a half-century of sectional feeling and race prejudice, made bitter by civil war, interrupted that law of trade for generations in this country. That period is now past. Commerce will now return to its own in the revival of trade relations between the great empire tributary to the Gulf and the equally vast industrial empire of the Great Lakes region.

All that is required is the development of the necessary channels of commerce and routes of transportation. The General Government has started upon the revival of this commerce by appropriating something like $60,000,000 in the aggregate for a permanent and reliable channel of navigation from Minneapolis to the Gulf of Mexico. But through commerce into the Great Lakes, which carry the greatest tonnage in the greatest merchant fleet floating the American flag, is necessary to put the great arteries of North and South commerce into complete and normal circulation. Commerce does not flourish on dead-ends of trade channels. Trade circulation begins when the dead-ends are punched through to complete the circulatory system. When Lake and Gulf meet, then true commerce between North and South begins in earnest, and the barges of the Great Mississippi will carry full cargoes.

Of a total of 90,000,000 tons of Great Lakes commercial freight, 72,000,000 tons, or 80% passes through the Soo canals to or from Lake Superior.

This demonstrates that the logical destination of a Lakes-to-the-Gulf through waterway is a link joining the Mississippi river with Lake Superior.

The St. Croix river is the direct north and south tributary of the Mississippi and rises within 20 miles of Lake Superior. It therefore affords the natural channel of canalization between lake and river. This is the route declared by U. S. Engineers as most feasible for uniting the greatest river of our continent with the greatest lake.

No one can estimate in advance what tonnage will develop in a revival of commerce between North and South, between Lake and Gulf, between the Mississippi Valley and the Pacific

via the Panama Canal. It is a matter which future development only can determine. The same is true, however, in regard to the tonnage which will pass the Panama Canal. Foresight and faith are the basis for such enterprises. Faith in the development which should follow the linking of Atlantic and Pacific has caused this country to venture on an investment of $375,000,000. The linking of Lakes and Gulf by the Lake Superior-Mississippi Canal involves the comparatively light investment of $8,000,000. Were there no other considerations and benefits to accrue, the opening of a North-and-South channel of commerce through the center of the United States, bringing together in one system the commerce of the Great Lakes and the commerce of the Gulf and Pacific, alone justifies the small investment necessary as shown by the estimates of three preliminary examinations and surveys by U. S. Engineers. Germany, France, Austria-Hungary, or any other European industrial and commercial power would not hesitate to invest many times that sum to insure such a vital and important national development.

48. **BENEFITS TO CO-OPERATING RAILROADS:**

It is safe to say that every enterprise which develops industry and commerce, which builds up farming settlements and cities, which makes undeveloped natural resources contribute to commerce and the support of population, directly or indirectly benefits the railroad. If the railroad loses the handling of one shipment, it makes up by being supplied with two other shipments. If it loses the haul of a car of coal or stone because that load can be more economically hauled by water, it makes double profit by having the haul of an increased volume of higher class merchandise at higher rates and with greater speed of transit, and a larger margin of profit in handling.

Then it is patent, that the river and canal reach along their shores undeveloped or poorly developed resources, industries and towns, which the railroad cannot profitably, or has not been able, profitably to reach and develop. The river and canal can do this work far more conveniently and economically than the railroad. The business developed becomes revenue freight

at some stage of its route for the railroad; and the town, industries, resources and commerce developed add directly or indirectly in the final result to the earnings of rail transportation.

Again, whatever works to the maximum efficiency and economy of industrial and commercial operation, works in the end to the mutual and reciprocal benefit of all factors involved, and, as one of the chief factors in the general system of industrial and commercial organization, the railroad is a joint beneficiary with all.

For example, take the comparative rail and water terminal investment, fixed charge and operating cost. Byers finds that the interest and depreciation on 38 leading freight terminals in the United States produces an average fixed charge of 28c per ton on each ton of merchandise handled at those terminals. When the river and lake harbor can operate on a fixed charge of 1c to 3c per ton for the classes of heavy freight which the barge fleet handles, is not the railroad, as well as the rest of humanity, better off to let the barge handle that freight, and for the railroad to handle other higher class freight in which the fixed charge for terminal handling would be a minor item?

The railroads of Europe have found development and progress in the co-operative activity of waterway and railway. They obtain higher average rates in handling higher average classes of tonnage. Leading railway authority in this country has arrived at the same view. Therefore, in carrying forward this project to completion, the basis should be the benefits to be achieved through rail and water co-operation, rather than to count on rail and water friction and hostility, to the detriment of all concerned.

CONCLUSION.

A. The project is justified by the reduction it will effect in freight rates. The reduction of the rail rate of 6 mills and more per ton-mile to 1.5 or 2 mills per ton-mile on the tonnage available to the project reimburses the United States many times over for its investment. This transportation rate economy does not cease at the canal, lake and river dock, but has

its general effect on transportation rates generally through an extensive territory even remote from the waterways.

B. The project is justified because of the effect which the addition of 250 miles of transportation facilities will have in developing commerce and industry. Here, again, the benefits are not merely local, but extend through a great commercial and industrial area which is in many directions made a common beneficiary.

C. The project is justified by the tonnage of coal, flour, grain, general merchandise, and large volume of miscellaneous commodities which it will handle to the mutual benefit of the labor and capital employed in the industries and to the common good of both the local and distant consumer who receives the products at a reduced cost of living.

D. The project is justified as a link in a channel of commerce between the Government Mississippi River project of improvement in which nearly $150,000,000 of the nation's revenues are invested, and the Great Lakes project of navigation in which it is estimated that for improvement and operation and maintenance to date the nation has an aggregate investment of $100,000,000; this proposed $8,000,000 connecting link adding to the efficiency and carrying out the main purpose of both in creating a national system of waterway transportation and commerce.

E. The project is justified as a necessary national link in a system of commerce between Mississippi Valley and Atlantic, and again between Great Lakes, Gulf and Pacific; and that, through the industrial heart of the nation, where it can be of maximum service to the people and their industrial and commercial activities.

F. The project is justified as the chief effective way by which the Lake Superior region and Upper Mississippi Valley may realize their direct share in the Panama Canal Improvement for development of commerce.

G. The project is financially justified as a Government investment by the additional increment of federal revenue it will produce. From Minnesota and Wisconsin the Federal Government will collect an aggregate of $20,000,000 to $25,-

000,000 annually as their proportional contribution of internal revenue, customs tariff duties, income taxes, and miscellaneous revenues. Additional transportation facilities developing industries and commerce, increasing property values and earnings, and thereby increasing the income, purchase power, and consumption of the people, increases these federal revenues. If this commercial and industrial enterprise through development of waterway transportation increases the federal revenues from the States of Minnesota and Wisconsin only 2% per annum, it pays the annual $420,000 estimated by U. S. Engineers for cost of operation, maintenance, and 3½% interest on investment.

FUTURE GOVERMENT AND STATE CANAL WILL BE AMPLY PROTECTED FROM RAILWAY BOYCOTTING AND RAILWAYS WILL BE COMPELLED TO EXCHANGE TRAFFIC WITH WATERWAYS FAIR TERMS.

Current history clearly foreshadows the end of the monopolistic methods railway combinations have used in the past in crushing canal and waterway competition. Federal and State governments will no longer tolerate such practices.

In Panama canal legislation Congress has indicated its policy by providing against railway ownership of vessels in competition with such railways. This was done because otherwise railway owned boats would monopolize coast wise traffic passing through the canal. The opening of the Panama Canal, where $375,000,000 of public money has been spent, creating as it will new currents of commerce affecting the trade of every section of the United States and the world, will keep the attention of the nation focused upon waterway development and upon every attempt to strangle or destroy it. This interest will be intensified by the completion and opening of the new Erie Canal in 1915, where the people of the state of New York not only have expended more than $100,000,000 in the construction of the canal but, realizing that the old Erie Canal failed in part because the competing railways had purchased and gained control of the terminals, appropriated $19,000,000 for

the purchase of adequate terminals and terminal facilities therefor.

In addition to this a traffic department for the new Erie will be provided, the State will control the terminal charges and will control and require physical connections to be made between the canal and all of the railroads tributary thereto, facilitating exchange of freight between water and rail. The canal authorities and public service commission of the State will also control the making of joint rates for canal and rail traffic and the State is otherwise prepared to protect water traffic on the new Erie. It is estimated by government engineers that the new Erie will carry fifteen million tons of freight annually.

Is it conceivable that in the atmosphere created by the opening of these two great canal projects a canal project such as the one under consideration from Lake Superior to the Mississippi River can or will be controlled or dominated by railways? Is it possible under such conditions that the states of Minnesota and Wisconsin and the United States government, warned as they now are by the examples of railway hostility, domination and control of the canals and waterways of Europe and the United States in the past, will not take full and adequate measures to protect this canal and by such measures absolutely prevent the evils of railway boycotting and domination so fully reported upon by the authorities quoted herein? The States of Minnesota and Wisconsin will provide adequate terminals with the most modern terminal facilities; they will require physicial connection by all of the railways tributary to the canal; they will provide the necessary legislation for requiring the making of reasonable and fair joint through rates and for the equitable division thereof between canal and rail carriers so far as intrastate business is concerned, and there is no doubt but that Congress will provide the necessary legislation therefor so far as interstate commerce is concerned.

The public demand for relief from two great economic evils is ever increasing.

First, the demand for lower rates of transportation;

Second, the demand which amounts to a great economic necessity that the ever present menace of railway congestion and consequent enormous loss to countless thousands of people of the nation be allayed by such a great increase in the facilities of transportation as can only be provided by canals and waterways.

Transportation authorities agree that in recent years the movement of traffic had increased entirely out of proportion to the increase in transportation facilities. During the period of 1900 to 1910 railway mileage increased 35.9%, while the increase in freight ton mileage was 80%. It is said by the National Waterways Commission that with the next period of expansion there is a strong probability of worse congestion of traffic than ever occured before. Congestion of traffic acts upon commercial life exactly as a financial panic, only the loss, damage and wreckage are perhaps greater, more material and more lasting in their effects. The nation has sought and we hope, found relief from currency panics in the reserve bank system. It now seeks relief from commercial congestion, stagnation and consequent enormous losses in provisions for additional transportation by means of waterway improvements and canal extensions. The building of this important canal project is therefore of the utmost importance.

If this project is not commercially feasible because of the conditions found to exist by the local board with reference to railway control and domination of water traffic, resulting in failure of waterways to obtain and hold their fair share of freight and which will, in the opinion of the local board, prevent this canal from obtaining traffic, then it logically follows that no further appropriations should be made by Congress for the improvement of any inland canal or waterway. All reports and findings of commissions, committees of Congress and observations of students of transportation are to the effect that the same conditions as to railway control, etc., found by the local board to exist, are also found to exist and operate with reference to every canal and waterway of the Nation. What is the logic that justifies the improvement of the Mississippi River,

the Missouri River, the canals connecting New Orleans with the Alabama coal fields, the Ohio river, when history shows that each of these waterways is in the same condition with reference to railway competition and domination as stated by the local board to exist with reference to the projected canal?

It is the experience of the nations of continental Europe that unless restrained by government railways could and would destroy water traffic. They did so until the governments concerned protected waterways from the unfair competition of railways. What has been done to protect waterways in those countries can and will be done in the United States. But there is no middle ground. Either we must confess that our policy of waterway improvements is a failure because of railway superiority or unfair competition and abandon the entire field of transportation to the railways and cease making appropriations for waterway improvements, or we must continue to improve our waterways, trusting to congress and the states concerned to enact the necessary legislation to protect the public investments in such waterways.

Finally we desire to add that the report of the local board should not be concurred in but the same should be modified or set aside and the project recommended as commercially feasible. That if the general board shall deem it advisable to recommend the proposed canal upon condition that the localities and states interested provide proper terminals and terminal facilities open to all upon equal terms, subject to public control and free from railway or other monopolistic control so as to insure such fair treatment of canal commerce as may be within the power of the states and localities interested, such conditions will be cheerfully accepted and complied with.

In consideration of this project if the general board should find there are any other conditions subject to which the pro-

ject can be recommended such conditions will be accepted and performed by the states or localities interested, if possible.

Respectfully submitted,

LAKE SUPERIOR AND MISSISSIPPI RIVER CANAL COMMISSION OF MINNESOTA.

GEORGE H. SULLIVAN,
Stillwater, Minn., Counsel for Minnesota Commission.

By A. O. EBERHART, Governor and ex-officio chairman.
IRA B. MILLS, Secretary.

LAKE SUPERIOR AND MISSISSIPPI RIVER CANAL COMMISSION OF WISCONSIN.

E. F. ACKLEY,
Chippewa Falls, Wis., Counsel for Wisconsin Commision.

JOHN CHINNOCK, Chairman.
E. F. ACKLEY, Secretary.
F. N. STACY, Statistician.

EXHIBITS

EXHIBIT I.

MINNESOTA COUNTIES TRIBUTARY TO CANAL AND RIVER

	Population.		Valuation Farms.	
	1910	1900	1910	1900
Carlton	17,559	10,017	$ 3,759,913	$ 939,664
Chisago	13,537	13,248	12,259,044	5,905,326
Dakota	25,171	21,733	22,986,004	11,793,346
Goodhue	31,637	31,137	32,266,663	18,044,617
Hennepin	333,480	228,340	34,967,221	19,909,980
Houston	14,297	15,400	16,836,250	9,944,080
Pine	15,878	11,546	7,453,287	2,273,424
Ramsey	223,675	170,554	9,726,904	5,621,973
Wabasha	18,554	18,924	19,702,340	12,080,170
Washington	26,013	27,808	16,334,539	9,062,150
Winona	33,398	35,686	22,718,884	14,371,809
St. Louis	163,274	82,932	6,798,209	1,152,486
	916,473	667,325	$205,839,258	$111,099,025

WISCONSIN COUNTIES TRIBUTARY TO CANAL AND MISSISSIPPI RIVER

	Population.	Valuation Farms.	
	1910	1910	1900
Barron	29,114	$ 18,976,694	$ 6,374,063
Bayfield	15,987	3,209,775	615,578
Buffalo	16,006	16,581,677	9,892,567
Burnett	9,026	4,914,983	1,670,203
Crawford	16,288	12,338,063	6,868,630
Douglas	47,422	2,795,283	722,199
Dunn	25,260	20,913,419	8,748,003
Grant	39,007	42,426,158	26,305,272
La Crosse	43,996	13,790,945	9,298,824
Pepin	7,577	5,971,873	3,254,996
Pierce	22,079	18,997,948	10,733,194
Polk	21,367	16,606,522	6,458,007
St. Croix	25,910	23,998,981	12,022,751
Trempealeau	22,963	21,411,077	11,923,019
Vernon	28,116	25,289,099	13,556,799
Washburn	8,196	3,570,620	702,311
	378,314	$251,793,117	$129,086,416

FARM CROP STATISTICS AND VALUES

	No. Farms. 1910	Farm acres cultivated.	Crop value.	Livestock value.
Carlton	1,195	120,505	$ 430,866	$ 422,503
Chisago	2,005	225,773	1,544,517	1,344,671
Dakota	2,163	329,801	3,177,701	2,316,378
Goodhue	3,090	462,052	3,997,757	3,507,509
Hennepin	3,853	284,378	4,132,598	2,809,233
Houston	1,912	327,094	1,979,513	2,178,443
Pine	2,066	230,689	846,136	904,663
Ramsey	1,067	60,543	1,072,780	711,008
Wabasha	1,787	320,984	2,736,692	2,170,305
Washington	1,943	226,312	2,129,792	1,669,805
Winona	2,141	374,234	2,712,087	2,638,487
St. Louis	2,465	272,995	919,360	726,394
	25,687	3,235,360	$25,679,829	$21,399,399

	No. Farms 1910	Crop value.	Livestock value.
Barron	3,852	$ 2,156,442	$ 2,229,092
Bayfield	1,086	343,579	351,244
Buffalo	2,161	2,203,637	2,479,855
Burnett	1,676	552,902	612,807
Crawford	1,983	1,797,644	1,896,759
Douglas	853	255,583	267,042
Dunn	3,297	2,580,851	2,565,337
Grant	4,056	4,702,792	5,694,621
La Crosse	1,811	1,694,725	1,867,574
Pepin	1,038	796,771	755,252
Pierce	3,213	2,802,150	2,327,125
Polk	3,399	1,925,250	2,143,337
St. Croix	3,119	3,286,125	2,864,850
Trempealeau	3,008	2,747,785	2,885,615
Vernon	4,003	3,197,871	3,193,191
Washburn	972	401,184	405,508
	39,527	$31,445,291	$32,539,209

	Grain bushels.	Hay tons.	Potatoes bushels.	Fruit bushels.	Dairy cows.
Carlton	56,891	20,215	239,715	231	4,033
Chisago	1,116,799	63,920	1,874,597	4,957	14,405
Dakota	4,374,599	67,233	629,503	26,486	12,204
Goodhue	5,462,783	117,488	165,728	48,020	24,111
Hennepin	2,321,310	124,811	2,438,132	58,734	22,379
Houston	2,708,198	67,052	172,090	33,713	14,381
Pine	365,316	48,046	468,834	1,741	9,788
Ramsey	405,039	29,828	497,939	3,364	5,632
Wabasha	3,968,412	60,240	198,128	41,511	11,105
Washington	2,533,926	62,250	758,162	15,162	10,637
Winona	3,786,077	75,319	308,444	39,443	16,450
St. Louis	44,214	28,247	355,537	137	6,234
	27,143,564	764,649	8,106,809	273,499	151,360

	Grain bushels.	Hay tons.	Potatoes bushels.	Fruit bushels.	Dairy cows.
Barron	1,553,990	102,025	1,194,012	8,435	23,081
Bayfield	59,769	13,827	159,710	2,451	2,385
Buffalo	3,009,703	75,059	177,849	25,478	21,627
Burnett	375,877	32,113	287,735	654	7,634
Crawford	1,503,992	62,699	137,894	47,030	16,681
Douglas	41,506	11,028	111,103	359	2,085
Dunn	3,104,140	86,168	689,975	17,129	24,001
Grant	6,090,204	140,497	368,825	51,708	36,520
La Crosse	1,980,076	60,423	242,130	32,455	19,981
Pepin	1,067,479	21,482	66,610	11,130	6,350
Pierce	3,975,946	74,378	282,223	35,995	17,912
Polk	2,047,748	93,561	468,361	4,210	22,473
St. Croix	4,731,807	103,271	375,615	5,193	23,804
Trempealeau	3,453,979	103,095	159,672	30,382	25,049
Vernon	2,587,993	116,389	319,026	73,412	30,187
Washburn	211,342	17,658	201,534	731	3,401
	35,795,551	1,113,673	5,242,274	346,752	283,174

SOUTHERN MINNESOTA COUNTIES TRIBUTARY TO CANAL

	Grain crop.	Potato crop.
Blue Earth	5,803,374	218,787
Brown	4,539,816	126,438
Carver	2,479,852	145,356
Dodge	2,291,293	79,181
Faribault	5,274,642	140,482
Fillmore	5,665,286	172,405
Freeborn	3,942,289	196,865
Le Sueur	3,076,483	117,476
Martin	6,284,197	175,074
Mower	5,902,794	231,528
Nicollet	3,252,347	97,739
Olmsted	4,219,103	164,919
Rice	3,647,307	159,742
Scott	2,230,773	105,268
Sibley	4,287,259	135,022
Steele	2,594,220	138,395
Waseca	2,770,886	107,100
Watonwan	3,564,741	69,430
	70,987,012	2,567,203

EXHIBIT II.

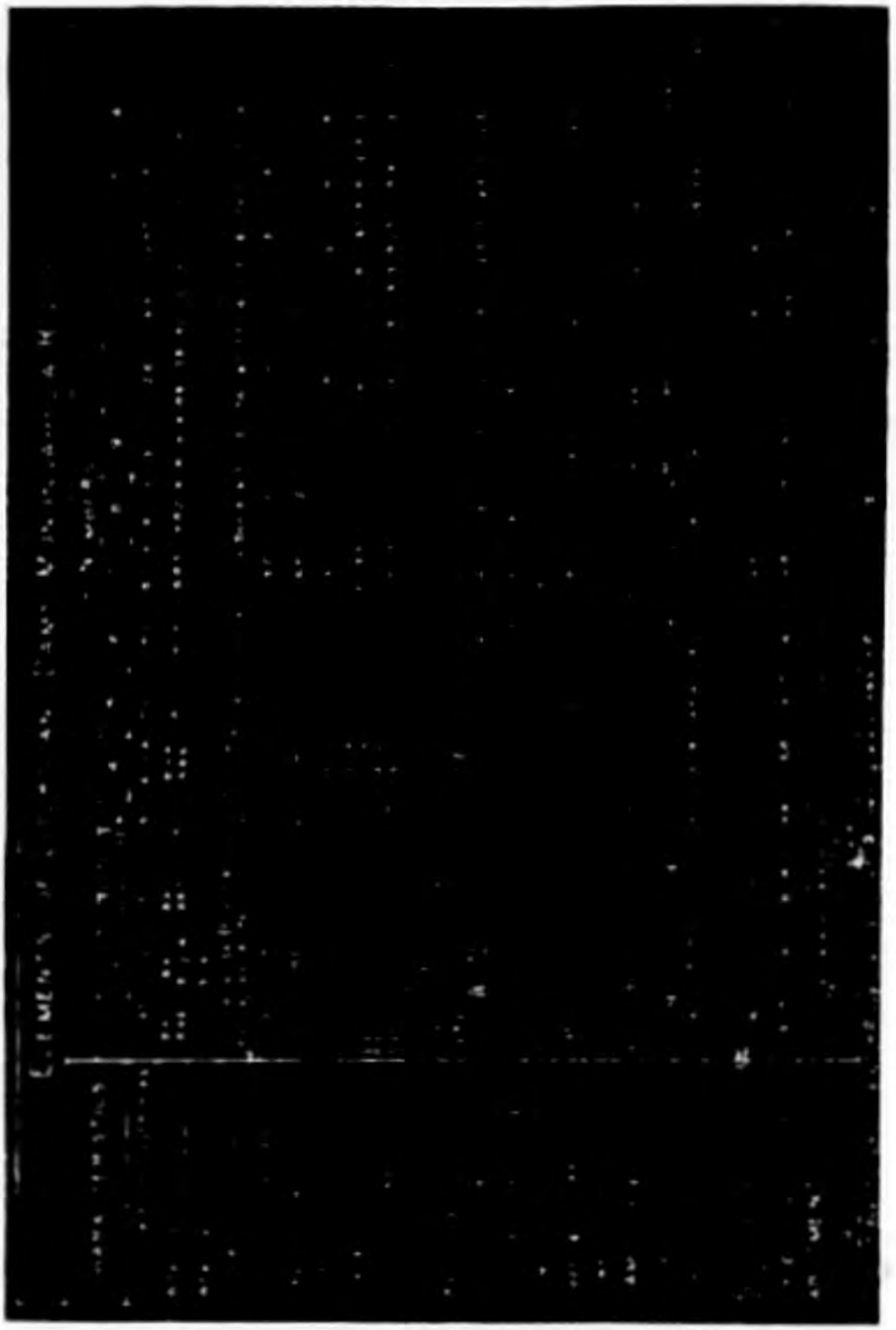

EXHIBIT III.

War Department

UNITED STATES ENGINEER OFFICE

2111 Farmers Bank Bldg.

Pittsburg, Pa., November 7, 1913.

Mr. F. N. Stacy,
Holland House, New York, N. Y.

Dear Sir:—In reply to your letter of the 4th instant to Colonel Newcomer, my predecessor in charge of this office, I transmit herewith a letter statement prepared by Assistant Engineer T. P. Roberts of this office, which answers your various questions in regard to commerce of rivers in the Pittsburgh, Pa., engineer district.

By direction and in the absence of Lt. Col. Francis R. Shunk, Corps of Engineers:

Very respectfully,

H. J. ROSSITER,
Chief Clerk.

War Department

UNITED STATES ENGINEER OFFICE

2111 Farmers Bank Bldg.

Pittsburgh, Pa., November 7, 1913.

From: Thomas P. Roberts, Assistant Engineer.

To: The District Engineer Officer, Pittsburgh, Pa.

Subject: Answers to questions proposed by the Lake Superior and Mississippi River Canal Commission.

1. **"Aggregate cargo tonnage per annum (approximate) on rivers and canals of your district?**

For several years past the total cargo tonnage of the Pittsburgh District has not varied much from 12,000,000 tons per annum. **Of this total about 9,000,000 tons** is coal from the Monongahela River, of which from 2,000,000 to 3,000,000 **tons are shipped down the Ohio to Cincinnati and points** further west and south. Of the residue of this coal about

1,000,000 tons (rough estimate) are shipped by rail to Conneaut Harbor on Lake Erie, and from 5,000,000 to 6,000,000 are locally consumed. Of the local consumption about one-half is made into coke by the Jones & Laughlin Company, mostly within the limits of this city. This firm is rapidly enlarging its river business in coking coal to meet the demands of its extensive new plant on the Ohio about 18 miles below Pittsburgh. This one firm's business will in the near future increase its river coal demand from its present 3,000,000 tons to about 5,000,000 per annum.

2. **"Average draft and cargo tonnage of coal carrying boats and barges on the Monongahela and through your canals."**

Until within the last few years all the boats, barges, and flats used in the Monongahela were of wood. These vessels are not registered and their number in use at present is unknown. Inquiries made in 1904 developed the fact that at that time there were between 1000 and 1100 vessels employed in the local trade of Pittsburgh, ranging from 200 to 400 tons. This did not include the coal flats used by Jones & Laughlin, about 500 in number, of average capacity of about 500 tons.

The boats and barges in the Ohio River traffic were estimated to number somewhat more than 2500, ranging from 500 to 1200 tons capacity each. The great number of boats heretofore used in the Ohio traffic is explained by the fact that owing to the uncertainties of the navigation of the river and time lost in trips to Memphis, New Orleans, etc., many of them were not loaded more than twice during a year. The upper Ohio was navigable for coal boats upon an average of only 89 days per annum, and these days very unequally distributed; six months sometimes passing without sufficient depth. With the dams so far completed on the Ohio, the average number of days per annum on the river from Pittsburgh, for the coal trade, has been increased to 116.

Already there appears to be a transformation in the Ohio River traffic. The American Steel & Wire Company has in operation a line between Pittsburgh and Louisville of 10 covered steel boats 200x36x9 ft. loaded depth, of 1500 tons cargo capacity, for wire nails, horse shoes, cotton ties, etc. Jones & Laughlin, for their Ohio River coal traffic, from the mines to Aliquippa, 18 miles below Pittsburgh, have in operation twenty-four 200x26 ft. steel boats, 7½ to 8½ feet draught, capacity 1000 to 1100 tons.

The Crucibile Steel Company of Pittsburgh has 22 steel barges, 100x26 ft., 7½ feet draught. Other parties are also

building steel boats. All of these steel boats ply the lower pools of the Monongahela river and some of them also ply upon the lower Allegheny River in the local business between mills. There are besides several hundred sand and gravel flats plying the three rivers about Pittsburgh.

The usual size of a coal tow on the Monongahela River for the lower Ohio and Mississippi traffic is 3 boats of 1000 tons each, 175x26 ft. 8 ft. draught, with tow boat, able to pass through the locks unbroken. The available size of each of the double locks, dams 1 to 6, is 360x56 ft. minimum depth on sills 8 feet. Nearly the same quantity of coal in more numerous barges of 500 tons capacity each is also passed. From 7 to 10 of the small flats with their steamer are able to be passed through the locks in one operation.

From the above it will appear that the locks on the Monongahela do a very miscellaneous business. The actual "average capacity" of the boats has never been given in the annual reports, although it could be calculated, if desired, from the monthly reports from the various locks.

3. **"Per ton cost of water transportation of coal in your district, stating approximate average ton mile rate, and giving, if data handy, a few cases of economical transportation."**

Several years ago the Jones & Laughlin Steel Company reported officially that the actual cost to them of moving coal from their mines to their mills and coke ovens in Pittsburgh, then doing a business of 2,000,000 tons per annum, was 4.2 cents per ton. The round trip distance was 104 miles, including the passage of 3 locks in each direction. The estimate included the return of the empty boats to the mines. The final result was a ton mile rate of .08 cents. To this was added, in this office, interest account on capital invested at 5% and 15% for depreciation of floating plant, which brought the ton mile rate up to .18 cents (or one mill and eight-tenths).

With the larger locks which have been recently constructed, or in progress enabling larger fleets of greater draft to pass unbroken down the Monongahela, there will be a considerable reduction in the above ton mile rate.

It is to be remarked that other firms doing a less regular business find the cost considerably more than that reported by the Jones & Laughlin Company. Some of them have estimated their cost at double the Jones & Laughlin figures for the same distance and number of lockings.

The actual running time and cost of steamers and fleets, if

it could be differentiated, will not, however, vary much from the Jones & Laughlin carefully estimated figures.

Very much could be said of the cost of transportation of coal on the Ohio and Mississippi rivers. The actual cost of round trip running expenses under favorable conditions on the Mississippi river between Pittsburgh and New Orleans, including return of empty boats, has been given at from 60 to 75 cents per ton, distance about 2,000 miles one way. This refers to a fleet carrying say 20,000 tons, Pittsburgh to Louisville, 600 miles, and thence with a larger tow boat, taking two of the upper river fleets or say 40,000 tons, Louisville to New Orleans, 1360 miles.

For an annual business of 3,500 tons of coal, systematized, on the river, Pittsburgh to Louisville, when 9 feet depth will be available for nearly the entire year, it has been estimated that the cost per ton, including return of empty boats to the mines, will be 24.1 cents, interest and depreciation of plant also included, which would make four-tenths of a mill per ton mile. The figures in no case include a profit. The figures if made now and taking into account the increased cost of steel boats over wooden ones heretofore engaged in the traffic, would be considerably increased in the item of first cost and interest minus a considerable reduction in depreciation, with the result of some final increase. It was estimated that on the improved river the existing business could be done with one-third of the capital investment, with fleets not larger in area than the area of Ohio River locks, viz: 600x110 ft.

4. **"Per ton cost of unloading coal from boats and barges to dock with modern machinery and methods".**

We have on the Monongahela, in pool No. 1, a double ladder coal dredge unloading 500 tons per hour, raising it about 70 feet, and transferring the coal by an endless belt several hundred yards to the cars which distribute the coal to the coke ovens for a cost of one quarter of a cent per ton. This is only about one-twelfth the cost of simply raising the coal with a clam shell to the height of 70 feet.

5. **"Amount per ton damage to coal from such handling".** On this point there appears about Pittsburgh to be very little demand in recent years for lump coal. The proportion of "run of mine", or non-screened coal has greatly increased as shipped both by rail and boat. It is therefore the case that the handling of the coal, provided it results in no loss of weight, results in no financial damage. For steam making also of late years **coal slack** with much dust in it carrying often much sulphur; as compared with screened coal; is much used on account of its

low price. Natural gas is used for domestic fires to a very great extent over most of the district.

6. **How does coal-carrying by water compare with rail transportation in regard to economy of transportation and handling".**

As for local rail rates they are very high as compared with river rates in the Monongahela valley, nevertheless in this city, owing very largely to its topography, much the greater part of the local demand is met by the railroads. If, however, the demand at a particular point on the river is very large, as is the case of the Jones & Laughlin Company, it would, with proper unloading machinery, be possible to save 25 cents per ton in Pittsburgh, as that firm does over the published rail rates. Coal from mines along the river at 40 to 60 miles distance is charged 38 cents a ton for transportation by rail, included in which is the usual "terminal charge" equal, it is understood, to 25 miles rail haul. The wagon haul from boats for domestic coal operates against the wide spread distribution of river coal in this city.

As a matter of fact but little attempt is made by the railroads in the Monongahela valley above Pittsburgh to compete in the local markets with boats for the home trade. Local mines often serve the trade. The railroads seem to be more concerned in the integrity of their main line tracks in the interest of their enormous through coal trade destined for the Lake region, than for local interests. Switches to small establishments are not favored, and cross over tracks are placed with rare exceptions only to serve the needs of the railroads.

The railroads naturally have the advantage over coal in boats so far as unloading is concerned, excepting where special machinery is employed, such as has been referred to elsewhere.

THOS. P. ROBERTS,

Assistant Engineer.

EXHIBIT 4.

Mr. F. N. Stacy,
Holland House,
New York, N. Y.

Dear Sir:

In reply to your letter of the 9th instant, I enclose herewith answers prepared by Mr. T. P. Roberts, Assistant Engineer, to your various questions concerning commerce, etc., on the Monongahela River.

For and in the absence of Lt. Col. Francis R. Shunk, Corps of Engineers:

Very respectfully,
H. J. ROSSITER,
Chief Clerk.

War Department,
UNITED STATES ENGINEER OFFICE
2111 Farmers Bank Building,
Pittsburgh, Pa.

November 13, 1913.

From: Thomas P. Roberts, Assistant Engineer.

To: The District Engineer Officer, Pittsburgh, Pa.

Subject: Answers to questions of Lake Superior and Mississippi River Commission, dated November 9, 1913.

1. **Data of traffic and vessels passing one of your principal Monongahela River locks for some month of comparatively large traffic this season, etc."**

The locks at Dam No. 3, 22 miles above Pittsburgh, are selected. The up and down river business from January to October by months during the present year has been as follows:

1913	Steamers.		Coal boats, barges and boat bottoms.		Coal traffic. Tons.		Total traffic. Tons.	
	Up	Down	No. Up	No. Down	Up	Down	Up	Down
Jan.	454	451	2,019	2,074	160	919,800	6,196	943,230
Feb.	485	478	2,080	2,106	0	983,680	3,115	1,000,930
Mar.	517	524	2,086	2,162	0	1,042,480	9,090	1,064,170
April	496	486	2,051	2,033	160	897,320	11,607	920,301
May	325	329	1,848	1,788	260	837,160	7,538	847,796
June	338	341	1,782	1,831	0	830,000	8,738	838,086
July	357	351	1,647	1,697	160	783,640	8,095	789,554
Aug.	401	400	1,989	1,967	80	910,600	5,960	916,837
Sept.	344	339	2,008	1,959	0	886,800	6,483	888,044

The daily records kept at the locks have to be consulted to differentiate the coal boats from the coal barges, and boat bottoms. It will require two or three days' time to obtain the desired information from the log book kept at Lock 3. The information will be mailed to any address as requested. By "boat bottoms" is meant—new coal boat bottoms shipped down the Allegheny and sent up to the mines on the Monongahela, to be sided up with plank gunwales 10 feet high, making boats 180x 26x10 ft. high of 1000 to 1100 tons capacity, at say 8½ feet draught.

2. **"Copies of printed reports of District Engineer," etc.**

Annual reports for fiscal years 1910 and 1912 of which spare copies have been found, are inclosed herewith. While the reports in general are for fiscal year, commercial statistics are given for calendar years 1909 and 1911. Also there is enclosed lock gauge records of sill depths, Locks 1 to 6, inclusive, for the year 1912. The lower gauges at locks are to be referred to as giving the navigable depth for boats, nothwithstanding that when the adjustable tops on the dams are raised there may be a greater depth on the upper than on the lower lock sill.

Regarding (a) navigable depths on upper Monongahela lock sills, will say that normal minimum depth at new Locks 10, 11, 12, 13, 14 and 15 is seven feet. High floods reach depths of 35 feet. Navigation is practicable until the lock walls are flooded say 20 feet on lower gauge. Locks 6, 7, 8 and 9, have been recommended for improvement and enlargement. At present in that part of the river during prolonged drouths the navigable depth is no more than 5 feet, a stage lasting on rare occasions for a month or more.

At present there is only one firm shipping coal from above No. 6 dam. The company's business amounts to about 25,000 tons annually, (from its own mines, in its own flat boats, to its own manufacturing establishment in McKeesport, Pool No. 2, a distance of about 85 miles below the mines). The mines are in the 14th pool. During seasons of severe drouth the depth available at Locks 7, 8, and 9 has been as low as 5 feet, permitting the safe passage of flats loaded to only about 4.5 to 4.75 feet, with flats carrying about 200 tons each. However, with, say 5 such flats a thousand tons could be moved in one fleet. Just what profits were at such times I have no information, but as the saving was fully $250 for each thousand tons over rail rates, I scarcely think the expense of the small boat, small crew and other operating expenses could have been so much. Thirty dollars per diem would have been, I think, a proper al-

lowance for this particular case, and not over 5 days to make a round trip. (The company's demands did not require the constant service of its tow boat to obtain its coal supply. At least more frequent trips could have been made.)

It is to be noted that it is to **area** rather than depth that credit is due for the wonderfully low rates of transportation possible on our western rivers, especially on the Ohio. But no other possible kind of steamer could handle fleets in the Ohio, with its varying conditions of depth and current velocities, but stern wheel boats, equipped with several balanced rudders which insure enormous steering power when the wheel is backed against the rudders. About busy locks, as on the Monongahela, side wheel or propellor boats with considerable tows, no matter what their ultimate power may be, would cause delays, confusion and accidents. Steamers which cannot quickly check the speed of their fleets and turn their fleets without the steamer moving more than a few feet, or even with the steamer itself tied to a pile, would never do for the peculiar traffic of the Monongahela, which is persistent night and day, winter and summer, with serious accidents exceedingly rare about the locks.

As to (b) **"Approximate first cost of coal handling with a double ladder dredge of 500 tons capacity per hour."**

The following information regarding unloaders has been received from the Jones & Laughlin Steel Company:

1. Capacity—
   - Hazelwood, (Monongahela River) 600 tons per hr. (approx.)
   - Aliquippa, (Ohio River) 800 tons per hr. (approx.)
2. Cost—
   - Hazelwood, approx. $30,000 to $40,000.
   - Aliquippa, much more on account of bad foundation.
3. Type—
   - Bucket at both plants.
   - Buckets measure 23½ inches by 26 inches by 4 feet 10¼ inches long, and hold 675 pounds each.

I will add to the above that part of the mechanism is a tension cable beneath the elevator which keeps pulling the boat against the coal all the time, so that the buckets are always full. The barges have sloped sides to favor movement of the coal towards the buckets. Only one man is required to attend to the unloading about the boat.

As to (c) **"Comparison of the cost of delivery of Monongahela River coal by rail and by river to points in the pools above No. 6, shows a saving of from 30 to 50 cents a ton in favor**

of water transportation." (Quoted from Report of Chief of Engineers, Vol. 1st, Page 905. 1912.)

Reference is to Dam 6 on the Ohio, about 29 miles **below** Pittsburgh. The center of the active river mining district on the Monongahela is about 50 miles **above** the city. The 50 cent saving is therefore for the 29 plus 50, of 79 mile distance, and the 30 cents for the 50 miles, distance to Pittsburgh.

In my previous letter I mentioned that some of the smaller manufacturers along the Ohio, above No. 6, were contemplating the erection of hoists to unload coal from boats, but as is usually the case there are from 4 to 6 more tracks between the factories and the river banks. The problem of the hoist is very difficult for some of them. This trouble explains why river coal is not more generally used along the extreme upper Ohio. To see coal passing one's doors on the river, so much cheaper than one must pay for it from another source must of course be "trying".

I will add in conclusion that on the projected so-called "Ship Canal", Ohio River to Lake Erie, leaving the Ohio river 25 miles below Pittsburgh, thence via the Beaver and Mahoning Rivers to near Ashtabula on Lake Erie, distance 103 miles, 30 locks, the carefully estimated cost of moving coal from Pittsburgh to and into vessels on Lake Erie, in boats of 11 feet draught, 2000 tons capacity, was actually 20.1 cents per ton, or 1.44 mills per ton per mile, from Pittsburgh to Lake Erie, but with toll charges of 30 cents and other sources of profit added, the final **charge** would be 60.2 cents per ton, or 4.30 mills per ton mile, as against 5.53 mills per ton mile by the Bessemer & Lake Erie Railroad, or over 8 mills per ton mile charged by other railroads from Pittsburgh to Lake Erie.

THOS. P. ROBERTS,
Assistant Engineer.

Addenda.

The average cargoes of various types of vessels passing Lock No. 3, Monongahela River, during March, 1913, is shown in the following statement:

Downward.

			Average per boat.
166	Boats carrying	166,000 tons.....	1,000 Tons.
1422	Barges carrying	722,560 tons.....	508 Tons.
570	Flats carrying	152,000 tons.....	268 Tons.
1	Model barges carrying	1,400 tons.....	1,400 Tons.

A few small naphtha boats passed are not included in the above. Five hundred and fourteen steamers passed downward

with the loaded vessels. The **upward** movement was practically the same, with the exception that all boats, barges and fleets were empty.

Several blueprints of coal hoists, including one of the double ladder dredges referred to in my previous letter, are inclosed.

THOS. P. ROBERTS,
Assistant Engineer.

EXHIBIT 5.

Mr. F. N. Stacy,
State Capitol Bldg.
St. Paul, Minn.

Dear Sir:

Noting your favor of the 30th ult; tonnage of coal received in New York Harbor is about 40 million per annum. In the absence of specific figures it is impossible to tell exactly what the amount is but it is understood to be about as mentioned, with something less than one-half retained for local use, the remainder shipped east and south.

The tonnage for city docks is brought by barge from rail terminals with the exception of a half-dozen yards which handle car ferry coal. **Cost of unloading from boats** is of itself a small matter when done by steam shovel, in this case probably amounting to three or four cents a ton, although in such a matter there will always be a question as to how much should be allowed for overhead expense, etc.

Yours Truly,
F. W. SAWARD,
General Manager.

Exhibit 6.

October 9th, 1913.

Mr. F. W. Stacey, Statistician,
Lake Superior & Mississippi River Canal Commission.
State Capitol Building, St. Paul, Minnesota.

Dear Sir:

Referring to your recent request for preliminary estimate on coal handling equipment of various capacities and arrangement. We are pleased to submit the following preliminary estimate:

For unloading coal from ore carrying vessels of 5000 to 12,000 tons of iron ore capacity and reloading the same in canal barges. Such arrangement is outlined by Sk. 1 showing a two-ton grab bucket operated by a movable steam steeple tower which discharges coal to the storage bunkers of approximately the capacity of the boat, from which storage it is discharged directly to the canal barge.

(1) At a maxium capacity rate of
500 tons per hour
5000 tons per 10 hour day
800,000 tons 6 months—160 days.

Unloading machinery costs		$100,000
Operating cost per ton	0.70 cents	
Fixed charge per ton.....	1.25 cents	
Reloading machinery costs		$ 50,000
Operating cost per ton	0.14 cents	
Fixed charges	0.625 cents	

For unloading from boats and storing in pile on ground which could extend back from the shore a distance of 500 feet. Such an arrangement as outlined by Sk. 4 showing a grab bucket operated on a mast and gaff for unloading to elevated hopper, from which point the coal is distributed to pile on land by automatic railway.

At a maximum capacity rate of
50 tons per hour
500 tons per 10 hour day
80,000 tons 6 months—160 days.

Unloading machinery costs		$6000.00
Operating cost per ton	2.5 cents	
Fixed charge per ton	0.75 cents	
Storing machinery costs		$2000.00
Operating cost per ton	0.42 cents	
Fixed charge per ton	0.25 cents	

This is a standard arrangement of coal handling machinery for the noted capacities. The machinery is simple and rugged and the entire plant can be operated with one engineer and two ordinary laborers.

(3) For unloading from boats and transferring on trestle 30 feet high to a distance of 1200 feet at any point on this line, coal could be deposited in storage on ground or discharged through chutes reloading to railroad cars. Such an arrangement is outlined by Sk. 2 which shows a grab bucket operated on a movable steam steeple tower which operates on a trestle about 30 feet high.

At a maximum capacity rate of		
750 tons per hour		
7500 tons per 10 hour day		
1,200,000 tons 6 months—160 days.		
Unloading machinery costs		$150,000
Operating cost per ton	0.70 cents	
Fixed charge per ton	1.25 cents	
Transfer machinery costs		$ 85,000
Operating cost per ton	0.25 cents	
Fixed charge per ton	0.71 cents	

For unloading from boats and transferring to storage pile or to railroad cars or reclaiming from storage pile and reloading to railroad cars or to barges. The arrangement is outlined by Sk. 3 and shows the complete system of unloading, storing, reclaiming and reloading either to railroad cars or barges. The sketch shows the plant arranged for a capacity of 500 tons per hour. A plant of similar operation can be arranged for any desired capacity by increasing the number of units.

At a maximum capacity rate of		
500 tons per hour		
5000 tons per 10 hour day		
800,000 tons 6 months—160 days.		
Unloading machinery costs		$100,000
Operating cost per ton	0.70 cents	
Fixed cost per ton	1.25 cents	
Transporting machinery costs		$105,000
Operating cost per ton	0.25 cents	
Fixed cost per ton	1.31 cents	
Reclaiming machinery costs		$150,000
Operating cost per ton	1.00 cents	
Fixed cost per ton	1.87 cents	

By referring to our catalogue you will see a detailed description of the equipment and operation of plants constructed along similar lines to those noted above.

The amount of damage that coal sustains in being handled depends to a great extent on the ultimate use of the coal. The extent of damage to bituminous coal occasioned by handling in plants such as described will be a very small percentage. If the coal is to be used in boiler plants, the breaking is of advantage rather than otherwise, as it is necessary to crush run-of-mine coal before it can be economically fired by automatic stokers.

Where large storage of coal is desired, the arrangement as shown by Sk. 3 permits the use of sub-aqueous storage as well as dry storage. By storing the coal under water the danger of spontaneous combustion is eliminated and the

deterioration of coal stored under water is less than stored in the open.

We trust that the enclosed estimates will answer your requirements in sufficient detail for your present purpose.

Yours very truly,

C. W. HUNT COMPANY, Inc.

Fred E. Murphy,
Assistant Chief Engineer.

EXHIBIT VII.

THE BROWN HOISTING MACHINERY CO.

Patent Automatic Hoisting & Conveying Appliances.

50 Church Street

New York, Oct. 23, 1913.

Mr. F. N. Stacy, Room No. 118,

Holland House, New York City.

Dear Sir:—We beg to acknowledge receipt of your favor of the 22nd, and are sending you, under separate cover, our catalogue "Q" covering Ore & Coal Handling Machinery, also a few photographs showing Coal Handling Plants which we have built.

In reference to cost of unloading, this depends upon the circumstances under which the unloading is done; that is, whether the coal is simply brought to a bin on the edge of the dock, or carried back to a stock pile. It also depends somewhat on the vessel, as to the size of the hatches and convenience of getting at the coal. We would say that **this cost would be from 2c to 5c a ton,** and in some cases may exceed this price of 5c.

We feel, if you could spare the time, that it would be well worth your while to stop off at our works at Cleveland, Ohio, where they have full information in regard to what has been done by our company in the Lake Superior district.

Trusting, however, that what we are sending you now will answer your purposes for the present, we are,

Yours truly,

THE BROWN HOISTING MACHINERY COMPANY.

Richard Devens,

Manager Eastern Office.

EXHIBIT VIII.

THE McMYLER INTERSTATE CO.

Cleveland, Ohio.

Car Dumpers, Locomotive Cranes, Ore and Coal Handling Machinery, Orange Peel, Clam Shell and Scraper Buckets, Railroad Equipment.

New York Branch,
Room 1756-50 Church St.

New York, October 28th, 1913.

Mr. F. N. Stacy,

Lake Superior and Mississippi River Canal Commission,
St. Paul, Minn.

Dear Sir:—With further reference to your letter of October 22nd, we enclose herewith photograph showing machinery for unloading coal from lake vessels to cars or storage hopper, or from lake vessels to canal barges; also from canal barges to dock at canal or river terminals.

Two of these mahcines have unloaded the S. S. "Transportation" as follows:

Number of tons unloaded first day of 9 hours....	4200
Number of tons unloaded second day of 8 hours..	2321
TOTAL.....	6521 Tons.

SIZE OF STEAMER:

Length, 376 feet.
Beam, 49 feet.
Depth, 30 feet.
Number of hatches, 9.
Size of hatches, 26 feet by 12 feet 6 inches.

This rate of unloading includes complete cleaning up of steamer.

We estimate that the cost of unloading coal under these conditions should not exceed two cents (2c) per ton for labor, fuel and repairs. This cost does not include the interest on the first cost of the machinery and wharf.

If storage back of the machines is desired we can furnish steam or electrically operated bridge tramways of any desired unloading and storage capacity.

Yours very truly,

THE McMYLER INTERSTATE CO.

EXHIBIT IX.

MEAD-MORRISON MANUFACTURING CO.

Coal Handling and Hoisting Machinery,
Singer Bldg., 149 Broadway,
New York City, September 26, 1913.

Mr. F. N. Stacy, Statistian.

Lake Superior & Mississippi River Canal Commission,
State Capitol Building, St. Paul, Minnesota.

Dear Sir:—Acknowledging yours of the 25th in reference to the handling and storing of coal in connection with the Lake Superior & Mississippi River Canal:

Taking up in order the questions asked in your letter:

1. What character of coal hoisting plant would you recommend for unloading coal from lake ore-carrying barges, at the Duluth-Superior docks and loading into canal barges, such plant to have 1,000,000 tons capacity for a navigating season of six months?

Ans. We would recommend a plant for unloading consisting of seven (7) towers, steam or electrically operated, with 1½ or 2 ton grabs delivering to cable road which would convey the coal from towers to storage bunkers located along the water front from which the coal could be delivered to the canal barges, or the cable road could be so arranged as to deliver direct to the canal barges without the intermediary storage bins. The advantage of the bins would, of course, be that the coal would be available at all times for loading the canal barges whether a lake steamer happened to be alongside or not.

The type of tower that we would suggest is similar to those used on the lakes at such plants as the Northern Coal & Dock, Superior, Wis., Duluth, Missabe & Northern Railway, Duluth, Minn., Hanna Coal & Dock Co., Superior, Wis.

A plant as described above would have an unloading capacity of about 1,000 tons per hour.

(a) What would be the cost of the required hoisting and conveying machinery alone?

Ans. The cost of the unloading towers, cable road and supporting structures, exclusive of foundations, would be about FOUR HUNDRED THOUSAND DOLLARS ($400,000.)

(b) What would be the aggregate cost of plant complete, with storage capacity of 500,000 tons, and auxiliary for weighing and screening?

Ans. The cost of a plant as above, with an unloading capacity of about 1,000 tons an hour and a storage capacity of 500,000 tons, with auxiliary screening plant and track scales for weighing the coal, would be about ONE MILLION DOLLARS ($1,000,000.) This would include the foundations, superstructures and machinery, but not the cost of the land.

(c) What would be the labor and fuel cost per ton for operating such plant?

Ans. We would estimate the labor cost per ton at about 2½c, and the fuel cost at about ½c per ton, making a total of 3c per ton of coal handled.

(d) What would be total cost per ton for operating and fixed charge, including depreciation, repairs, and interest on investment, not including site, at the interest rate of 4%?

Ans. On the basis of 3,000,000 tons handled in six months, we would estimate the cost per ton as above, at 12c. This cost would, of course, be very much reduced if the quantity of coal handled was doubled by running night shifts, in which case the cost might be brought down to 7c or 8c.

2. What character of coal handling plant would you recommend for unloading coal from canal barge of 200 to 800 tons at canal and river terminals?

Ans. For small capacities, not in excess of 500 tons per day, we would recommend a mast and gaff grab bucket equipment. If the capacity required was in excess of 500 tons, say up to 1,000 tons per day, we would recommend unloading towers, steam or electrically operated, with 1-ton grab. These towers would be of our standard equipment, similar to that installed for the Interborough Rapid Transit Co., 59th St. & North River, shown on page 25, catalogue No. 15.

(a) What would be the cost of the coal handling machinery for plant capable of unloading 500,000 tons in six months, hoisting to 100 ft. level and conveying 1,000 feet?

Ans. We estimate the cost of a plant to fulfill the above requirements, at TWO HUNDRED AND FIFTY THOUSAND DOLLARS ($250,000), exclusive of foundations.

(b) What would be total cost of such plant installed, not including cost of land, with storage capacity of 250,000 tons?

Ans. We estimate the cost of a plant as above described, not including the cost of land, but including the superstructures with machinery and foundations, at FOUR HUNDRED AND FIFTY THOUSAND DOLLARS ($450,000.)

(c) What would be labor and fuel cost per ton for such unloading at canal and river terminal?

Ans. We estimate the labor and fuel cost for unloading at canal and river terminals, at 3½c per ton. This on the basis of unloading being done by means of automatic machinery in quantity and not where hand-filled tubs would be used.

(d) What would be total cost per ton, including operating and fixed charge, interest at 4%, not including taxes and dividend on investment?

Ans. We estimate the cost, on the above basis, at 12c per ton.

3. What would be cost of plant for unloading on dock from canal barge 500 tons per day, and what would be cost per ton for operating such plant?

Ans. The cost of plant for unloading about 500 tons per day from canal barge would be about SEVEN THOUSAND DOLLARS ($7,000.) The cost for operating such a plant, for labor and fuel, on the basis of 500 tons per day, would be about 4c per ton.

4. Kindly name some of the principal points where coal hoisting machinery of the character named has been installed by you.

Ans. We would refer you to our catalogues No. 15 and No. 16, copies of which we hand you herewith. Most of the unloading plants, with large storage, are located on the Great Lakes around Duluth and Superior. Besides the plants shown in catalogue No. 15, we have recently installed some electrically operated man-trolley bridges for the Pittsburgh & Lehigh Dock Co., Duluth, the Milwaukee Western Fuel Co., 16th Street dock, Milwaukee, and the Semet-Solvay Company, Detroit, Mich.

Now, as to your question regarding the degradation of coal when being handled from boats and from box cars. We have no positive data on this subject. The opinion seems to prevail among coal dealers here in the East that the loss in handling anthracite coal is between 5c and 10c per ton for each breaking of bulk, no matter how accomplished. Bituminous coal, of course, will not lose as much in the breaking of bulk. We should say there would be no greater loss in handling coal from boats than in handling from box cars for the reason that the units in which the coal is handled when taking from boats are larger than the units when handled from box cars, in addition to which, when transportation is made by car, there is the degradation due to the motion of the car.

We trust that the above will be of assistance to you and will be very glad to give you any further information within our power.

Yours truly,

MEAD-MORRISON MFG. CO.,
O. G. Dale, New York Manager.

EXHIBIT X.

DEPARTMENT OF DOCKS AND FERRIES
The City of New York.
Bureau of Ferries

Office of Superintendent, Ferry Terminal Building,
Corner Whitehall and South Streets.

New York, Sept. 30, 1913.

Lake Superior and Mississippi River Canal Commission,
Mr. F. N. Stacy, Statistician.

Sir:—Replying to your request for information in connection with the annual delivery of coal and cost per ton of handling the same at our St. George pockets, I would advise you as follows:

1st: Total annual deliveries amount to approximately 65,000 tons. The coal delivered is anthracite of pea size.

2nd: The unloading plant consists of a steam driven, double drum inclined ways clam shaped bucket hoist. The hoist is approximately 80 feet, and the bucket will hold approximately one ton. The coal is unloaded from the bucket into a receiving hopper, and passes from the receiving hopper into the weighing hopper, holding approximately 3500 pounds when full. The rate of discharge of the coal from the receiving hopper to the weighing hopper is controlled by the Weighmaster through the medium of a swinging gate. After weighing, the coal is discharged from the weighing hopper into the loading chute over a pivoted bucket conveyor, by means of which it is distributed throughout the coal bunkers. The coal bunkers have a capacity of approximately 1800 tons, and the travel of the conveyor to distribute the coal throughout the bunkers is approximately 150 feet. The coal conveyor is motor driven, current for the same being furnished by the local electric light plant.

3rd: The operating cost per ton of coal unloaded from the barge is as follows:

1 Coal Hoist Engineer	$4.50 per day.
1 Laborer for weighing and tending conveyor	2.50 per day.
Total	$7.00 per day.

Or a total cost of $2555.00 per year.

The coal for hoisting purposes, 13 tons per month, at $4.00 per ton, plus miscellaneous supplies, cost $650.00 per year.

Cost of power for the conveyor motor, $250.00 per year.

Total cost of unloading 65,000 tons per year, $3455.00, or 5 3-10c per ton.

The 65,000 tons per year is not the maximum capacity of the plant, but it is all that the plant is required to handle in order to meet the demands. Coal is delivered alongside in barges holding from 600 to 800 tons. The cost of trimming is borne by the contractor delivering the coal, and is not included in the above.

4th: The total unloading cost per ton, including operating expenses, depreciation of plant and interest on plant investment: The depreciation o fthe plant has been found to be negligible, in that in the six years this plant has been in service approximately no repairs have been required to maintain the same in an efficient and operating condition other than what could be made by the men assigned to operate the same.

The coal pockets and hoist were constructed as part of a contract including other terminal buildings, waiting rooms, etc., but it is estimated that the coal pockets and hoist alone would involve for first cost an expenditure of $50,000.00, the interest charges on which would be at the rate of 4% per annum,—$2,000.00 per year, making the total cost, including interest on plant investment and depreciation for hoisting 55,000 tons, or $5455.00 per year; or approximately 8 4-10c per ton.

5th: With a plant operating full capacity it is estimated that not less than 400 tons per 8 hour day would be hoisted, at which rate the maximum unloading capa-

city of the plant would be not less than 146,000 tons per year, assuming that the plant is operated only 8 hours during any one day.

The cost of operation for coal for the hoist and power for the motor would be increased approximately in proportion to the amount of coal hoisted, so that the cost per ton of coal unloaded from barge, including operating expenses, depreciation of plant and interest on plant investment with the plant unloading 146,000 tons per year, would be:

Labor, $2555.00.
Fuel for the hoist, 27 tons per month, at $4.00 per ton, including miscellaneous supplies, $900 per year.
Power for coal conveyor motor, $550.00 per year.
Interest on plant investment at 4% per annum, $2000.
Or at the rate of approximately 4 1-10c per ton.

I trust this will furnish you with all the information you desire. Any further information that you may require will be forwarded to you upon your request for the same.

Very respectfully,

P. HANLEY,

Superintendent of Ferries.

EXHIBIT XI.

COMPARISON OF UNITED STATES RAIL AND EUROPEAN WATER RATES.[1]

1.—COAL.

	Rail distance.	Rail rate.	Water rate.	Per cent water of rail rate.
Rhine.	Miles.	Per ton.[2]	Per ton.[2]	
Ruhrort to Mannheim	202.45	$1.88	$0.409	21.8
Iowa State rates	200-210	1.32	.....	30.9
Illinois State rates	200-210	1.11	.....	36.8
Hocking coal district to lake front	[3] 220	.85	.....	48.1
Ruhrort to Strassburg	267.65	2.26	.726	32.1
Iowa State rates	260-270	1.44	.....	50.4
Illinois State rates	260-270	1.21	.....	60
Fairmount coal district to Lorain	[3] 274	.97	.....	74.8
Ruhrort to Frankfort on the Main	176.14	1.64	.474	28.9
Iowa State rates	175-180	1.24	.....	38.2
Illinois State rates	175-180	1.06	.....	44.7
California, Pa., to Coshocton, Ohio (Pennsylvania R. R.)	173	.95	.....	50
Elbe.				
Hamburg to Magdeburg	156	1.50	.64	42.7
Iowa State rates	150-160	1.18	.....	54.2
Illinois State rates	150-160	1.02	.....	62.7
Pittsburgh No. 8 district to lake front	[3] 150	.88	.....	72.7
Hamburg to Berlin	174	1.69	.71	42
Iowa State rates	170-175	1.225	.....	57.9
Illinois State rates	170-175	1.05	.....	67.6
West Newton, Pa., to Cleveland, Ohio (Baltimore & Ohio	190	1.00	.....	71
Hamburg to Breslau	370	2.86	1.48	51.8
Iowa State rates	370-380	1.66	.....	89.1
Illinois state rates	360-380	1.37	.....	108.0
Thacker coal district to Sandusky	[3] 365	.97	.....	152.6
Hamburg to Dresden	286	2.36	1.24	52.5
Iowa State rates	280-290	1.48	.....	83.8
Illinois State rates	280-290	1.24	.....	100
Kanawha district to Toledo	[3] 325	.97	.....	127.8

[1] The United States rail rates were obtained from the Interstate Commerce Commission and the Bureau of Railway Economics. They are all commodity rates in carload lots. The German rail and water rates are taken from the tables given above.

[2] The foreign rates are for the metric ton of 2,204 pounds, the American rates are for the short ton of 2,000 pounds, and hence should be increased by 10 per cent in order to be strictly comparable.

[3] Estimated.

2.—GRAIN.

	Rail distance.	Rail rate.	Water rate.	Per cent water of rail rate
Rhine.	Miles.	Per ton.	Per ton.	
Rotterdam to Mannheim	298	$5.81	$0.626	10.8
Iowa State rates	290-300			
Wheat, flour, millet, and flaxseed		2.70		23.2
Corn, oats, barley		2.24		27.9
Illinois State rates	290-300			
Wheat		2.42		25.9
Other grains		2.18		28.7
Fremont, Iowa, to Chicago (Chicago, Burlington & Quincy R. R.)—Wheat	296.6	2.60		24.1
Rotterdam to Strasburg	362.66	5.71	1.102	19.3
Iowa State rates	360-370			
Wheat, flour, millet, and flaxseed		3.08		35.8
Corn, oats, barley		2.56		43
Illinois State rates	360-380			
Wheat		2.60		42.4
Other grains		2.36		46.7
Rochester, N. Y., to Harrisburg, Pa. (Pennsylvania R. R.)—Wheat	356	2.00		55.1
Rotterdam to Frankfort on the Main	282.56	4.36	.764	17.5
Iowa State rates	280-290			
Wheat, flour, millet		2.66		28.7
Corn, oats, barley		2.20		34.7
Illinois State rates	280-290			
Wheat		2.38		32.1
Other grains		2.16		35.4
Burnham, Pa., to New York City (Pennsylvania R. R.)—Wheat	267	2.00		38.2

2.—GRAIN. (Continued.)

	Rail distance.	Rail rate.	Water rate.	Per cent water of rail rate
Elbe.	Miles.	Per ton.	Per ton.	
Hamburg to Magdeburg	156	2.97	.67	22.5
Iowa State rates	155-160	.....	.....	.....
Wheat, flour, millet, and flaxseed	.....	1.96	.....	34.2
Corn, oats, barley	.....	1.62	.....	41.3
Illinois State rates	155-160	.....	.....	.....
Wheat	.....	1.90	.....	35.3
Other grains	.....	1.72	.....	39
Neal, Kans., to Kansas City, Mo. (Missouri Pacific)—Wheat	150	2.00	.....	33.5
Hamburg to Breslau	379	6.81	1.55	22.8
Iowa State rates	370-380	.....	.....	.....
Wheat, flour, millet, and flaxseed	.....	3.14	.....	49.4
Common barley	.....	2.62	.....	59.1
Illinois State rates	360-380	.....	.....	.....
Wheat	.....	2.60	.....	59.6
Other grain	.....	2.37	.....	65.4
Oakley, Kans., to Kansas City, Mo. (Union Pacific)—Wheat	377	2.90	.....	53.5
Hamburg to Dresden	286	5.21	1.26	24.2
Iowa State rates	280-290	.....	.....	.....
Wheat, flour, millet, and flaxseed	.....	2.66	.....	47.4
Corn, oats, barley	.....	2.20	.....	57.3
Illinois State rates	280-290	.....	.....	.....
Wheat	.....	2.38	.....	53
Other grain	.....	2.16	.....	58.3
Rutledge, Mo., to Chicago (Atchison)—Wheat	287	2.40	.....	52.5
Hamburg to Breslau	174	3.28	.79	24.1
Iowa State rates	170-175	.....	.....	.....
Wheat, flour, millet, and flaxseed	.....	2.02	.....	39.1
Corn, oats, barley	.....	1.68	.....	47
Illinois State rates	170-175	.....	.....	.....
Wheat	.....	1.96	.....	40.3
Other grain	.....	1.78	.....	44.4
Lewisburg, Pa., to Wilmington, Del. (Pennsylvania R. R.)—Wheat	185	2.00	.....	39.5

EXHIBIT XII.

WESTERN STATES LINE—CANAL AND LAKE

West-Bound Rates.

CLASS RATES—IN CENTS PER 100 POUNDS

TO	1st Class	2d Class	3d Class	4th Class	5th Class	6th Class	Rule 25	Rule 26	Rule 28
Cleveland, O.	40	35	28	19	17	15	30	22	22
Detroit, Mich.	41	37	29	20	17	16	31	23	23
Chicago, Ill.									
Milwaukee, Wis.	42	38	29	22	19	17	32	23	24½
*Sault Ste. Marie, Mich.									
Duluth, Minn.									
Superior, Wis.									
Hancock, Mich.	48	43	33	25	22	20	36½	26	28
Houghton, Mich.									
Dollar Bay, Mich.									
*Marquette, Mich.									
Minneapolis, Minn.	63	56	42	30	26	22	48	34	33
St. Paul, Minn. Group points.	63	56	42	30	26	22	48	34	33
Altamont, Ill. "	57	51	40	29	25	22	43	32	33
Annawan, Ill. "	59	53	41	29	25	23	45	33	33
Atkinson, Ill. "	60	54	42	30	26	23	46	34	34
Aurora, Ill. "	48	44	34	24	21	19	37	27	27½
Carthage, Ill. "	62	55	43	31	27	24	47	34	35
Danville, Ill. "	45	41	32	23	20	18	35	26	26
Galva, Ill. "	58	52	41	29	25	22	44	33	33
Joliet, Ill. "	45	41	32	23	20	18	35	26	26
Kankakee, Ill. "	45	41	32	23	20	18	35	26	26
Laura, Ill. "	57	51	40	29	25	22	43	32	33
Mason City, Ill. "	54	49	38	27	24	21	42	30	31
Moline, Ill. "	67	60	48	35	30	26	52	39	39½
Monmouth, Ill. "	62	55	43	31	27	24	47	34	35
Neponset, Ill. "	56	51	40	28	25	22	43	32	32
Peoria, Ill. "	53	48	37	27	23	21	41	30	30½
Racine, Wis. "	45	41	32	23	20	18	35	26	26
St. Louis, Mo. "	58	52	41	29	25	22	44	33	33
Streator, Ill. "	53	48	37	27	23	21	41	30	30½
Westville, Ill. "	51	46	36	26	22	20	39	29	29½
Trans-Mississippi "	58	52	41	29	25	22	44	33	33

*The rates to Marquette and Sault Ste. Marie do not include the dockage at those places, this company having no docks at these points.

ANCHOR LINE—RAIL AND LAKE

West-Bound Rates From New York.

CLASS RATES—IN CENTS PER 100 POUNDS

TO	1st Class	2d Class	3d Class	4th Class	5th Class	6th Class	Rule 25	Rule 26
Cleveland, O.	50	43	34	23	20	17	36½	27
Detroit, Mich.	51	45	35	24	20	18	38	28
Chicago, Ill. Milwaukee, Wis. *Sault Ste. Marie, Mich.	62	54	41	30	25	21	46	33
Duluth, Minn. Hancock, Mich. Houghton, Mich. *Marquette, Mich. Superior, Wis.	68	59	45	33	28	24	50	36
St. Paul, Minn. Group points	83	72	54	38	32	26	61	43
Altamont, Ill. "	77	67	52	37	31	26	57	42
Annawan, Ill. "	79	69	53	37	31	26	57	42
Atkinson, Ill. "	80	70	54	38	32	27	59	43
Aurora, Ill. "	68	60	46	32	27	23	51	37
Carthage, Ill. "	82	71	55	39	33	28	60	44
Danville, Ill. "	65	57	44	31	26	22	48	35
Galva, Ill. "	78	68	53	37	31	26	58	42
Joliet, Ill. "	65	57	44	31	26	22	48	35
Kankakee, Ill. "	65	57	44	31	26	22	48	35
Laura, Ill. "	77	67	52	37	31	26	57	42
Mason City, Ill. "	74	65	50	35	30	25	55	40
Moline, Ill. "	87	76	60	43	36	30	65	49
Monmouth, Ill. "	82	71	55	39	33	28	60	44
Neponset, Ill. "	76	67	52	36	31	26	57	42
Peoria, Ill. "	73	64	49	35	29	25	54	39
Racine, Wis. "	65	57	44	31	26	22	48	35
Streator, Ill. "	73	64	49	35	29	25	54	39
Westville, Ill. "	71	62	48	34	28	24	53	38
St. Louis, Mo. "	78	68	53	37	31	26	58	42
Trans-Mississippi "	78	68	53	37	31	26	58	42

*The rates to Marquette and Sault Ste. Marie do not include the dockage, this company having no docks at these points.

AVERAGE RATES ON IRON ORE, PER LONG TON, FROM PORTS NAMED TO OHIO PORTS, 1885-1911.

YEARS.	Escanaba.		Marquette.		Ashland and Other Head-of-Lake Ports.	
	Wild or daily rate.	Contract rate.	Wild or daily rate.	Contract rate.	Wild or daily rate.	Contract rate.
1885....	$0.78	$0.90	$0.98	$1.05	$1.25	$1.15
1886....	1.28	1.05	1.51	1.20	1.78	1.20
1887....	1.59	1.40	1.87	1.63	2.23	2.00
1888....	1.05	.90	1.30	1.15	1.43	1.25
1889....	1.01	1.00	1.19	1.10	1.34	1.25
1890....	.89	1.10	1.07	1.25	1.17	1.35
1891....	.84	.65	1.02	.90	1.11	1.00
1892....	.74	1.00	.98	1.15	1.15	1.25
1893....	.56	.85	.71	1.00	.77	1.00
1894....	.47	.60	.60	.80	.78	.80
1895....	.73	.55	.92	.75	1.13	.80
1896....	.52	.70	.66	.95	.77	1.05
1897....	.45	.45	.55	.65	.57	.70
1898....	.51	.45	.60	.60	.62	.60
1899....	.95	.50	1.08⅓	.60	1.29⅓	.60
1900....	.69⅓	1.00	.78	1.10	.84½	1.25
1901....	.64	.60	.79	.70	.89	.80
1902....	.59	.60	.66	.70	.77	.75
1903....	.61	.65	.72	.75	.81	.85
1904....	.53⅓	.55	.62	.60	.70	.70
1905....	.61	.60	.70	.70	.77	.75
1906....	.60	.60	.70	.70	.75½	.75
1907....	.60	.60	.70	.70	.75	.75
1908....	.50	.50	.60	.60	.65	.65
1909....	.52	.50	.61	.60	.66	.65
1910....	.55	.55	.65	.65	.70	.70
1911....	.45	.45	.55	.55	.60	.60

Charge to vessel in 1901 for trimming and unloading, 22 cents per ton; 1902, 19 cents per ton; 1903, 21 cents per ton; 1904, 19 cents per ton; 1905, 1906, 1907, 1908, 1909, 20 cents per ton; 1910 and 1911, 15 cents per ton. Wooden vessels requiring trimming paid an additional charge of about 3 cents per ton in 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, and 1911.

AVERAGE RATES ON HARD COAL FROM BUFFALO AND SOFT COAL FROM OHIO PORTS TO LAKE SUPERIOR AND LAKE MICHIGAN PORTS, 1892-1911.

YEARS.	Hard Coal.		Soft Coal.						
	Chicago.[1]	Duluth.	Milwaukee.[1]	Escanaba.	Duluth.	Green Bay.	Manitowoc.	Hancock-Houghton.	Sheboygan.
1892.....	59	43	58	43	43	55	49	.....	.....
1893.....	49	29	48	40	38	50	41	.....	.....
1894.....	46	25	48 ½	39	37 ½	49 ½	48	.....	.....
1895.....	59	24	54	39	36 ½	50	51	.....	.....
1896.....	36	24	33 ½	27	29	32 ½	32	.....	.....
1897.....	29	26	28 ½	29 ½	26	30	31	.....	.....
1898.....	28	23	28	26 ½	23	28 ½	28 ½	29.7	27.8
1899.....	73	49 ½	69	58	45 ½	66 ½	67	56.4	66.5
1900.....	48	39 ½	45	40	40	45	43 ½	41.3	43.6
1901.....	50	38	49	46	38	48 ½	48	39.5	45.3
1902.....	42	33	46 ½	41 ½	34 ½	46 ½	42	31.8	41.9
1903.....	48	38	50 ½	45	41 ½	50 ½	46	40.0	45.9
1904.....	43	34	47	40	37	45 ½	47	35.6	40.6
1905.....	44	34	46 ½	41 ½	33 ½	42	41 ½	35.3	41.525
1906.....	46	35	46	42	35	42	42	42.0	42.0
1907.....	40	31	40	35	30	35	35	50.0	35.0
1908.....	40	30	40	35	30	35	35	30.0	35.0
1909.....	41	32	37	31	31	32	31	31.25	31.25
1910.....	41	31 ½	35 ½	35	31	35	35	31.0	35.0
1911.....	35	30	32	31	32	31	31	32.0	31.0

[1] Rates to Milwaukee and Chicago are practically the same.

NOTE—Coal of all kinds is shipped in short tons and handled without charge to vessels.

INTERSTATE COMMERCE COMMISSION

Division of Statistics

Washington, September 15, 1913.

Mr. F. N. Stacy,

Holland House, New York, N. Y.

Dear Sir:—In reply to your inquiry of September 12, I regret to say that I have not yet been able to secure any data directly bearing upon the subjects of your inquiry. I enclose herewith a page from the December, 1911, Summary of Internal Commerce which gives (on page 584) the average charges for trimming and unloading iron ore. I have consulted the dockets of several recent cases decided by the Commission, viz.:

Bolleau Case, 22 I. C. C. 640;
Pittsburgh Vein Operators' Case, 24 I. C. C. 280;
Pittsburgh Steel Company, Opinion No. 2328,

and fail to find the data which you desire. The loading charges on coal from car to vessel vary between 5 and 10 cents per ton.

At the recent Fifth Annual Convention of the International Fuel Association, a paper was read on modern locomotive coaling stations, in which data are given showing the cost of installation, operation, and maintenance of various types of clam shells. By writing to the Secretary of the Association, Mr. C. G. Hall, 922 McCormick Building, Chicago, you may possibly procure a copy of the proceedings. I would also suggest that you communicate with the manufacturers of these shells for data regarding the practical operation of up-to-date unloading machinery. I have referred your inquiry to the Tariff and Accounting divisions of the Commission and shall forward to you the results of their inquires.

Respectfully,

M. JACOBSON,
Associate Statistician.

Average annual wheat rates by canal shipments between Buffalo and New York for the period 1888-1909 varied between 2.2 and 5.0 cents per bushel. The averages for the 1908 and 1909 seasons are given as 5.0 and 3.9 cents respectively. (Average monthly and season rates are given in the Monthly Summary of Commerce and Finance, Dec. 1909, p. 1165.)

EXHIBIT XIII.

AMERICAN STEEL & WIRE COMPANY
30 Church Street
New York City, Oct. 27th, 1913.

Mr. F. N. Stacy,
Holland House, Room 118,
New York City, N. Y.

Dear Sir:—Referring to conversation had with our Mr. Kuhn with regard to proposed tramways, for transporting various materials between point of manufacture or production to canal wharves, would say that it is very difficult to give very close figures in the absence of definite data as to profile of the ground, showing the exact horizontal distances and elevations and exact requirements at terminal stations, but for preliminary figures would say that tramway having a length of half a mile, a capacity of 75 tons per hour or 750 tons per day of 10 hours, would cost approximately $7500.00 to $8000.00 for the material which we would furnish—which would include all the cables, traction rope, carriers, machinery and metal work for the intermediate supports and terminal stations, including all bolts for erecting the structures and attaching the machinery, and complete set of working drawings for the erecting of the tramway.

To this should be added the cost of furnishing the necessary timber for all structures and the erecting of same in place, and installation of our tramway material, as well as freight from our works to destination. This would make an addition cost of approximately $4000.00 to $6000.00, making the entire tramway installation cost in the neighborhood of $12,000.00 to $14,000.00 erected and ready to run.

As previously stated, these figures are very rough, and we believe if we had proper data so as to lay out tramway to fit the actual conditions we would be able to revise our figures and make them appear more favorable.

As to cost of operation—the various catalogues and pamphlets left with you will give you some idea in this regard, but for the particular tramway installation outlined above, would say, assuming that you wish to transport flour in sacks, which would require the greatest amount of labor at the tramway terminals, this cost would amount to approximately $27.10 per day—divided as follows:

	Per Day.
Interest on the investment at 6%..	$5.60
Depreciation and maintenance, about 5% on $9,000	3.00
LABOR—Including 1 Foreman at $4.00	
6 Laborers at $2.00 each.....	16.00
Oil and grease	.50
Power, approximately	2.00

These figures are based on running the tramway for six months in the year, or for a total of 150 days, and based on a daily capacity of 750 tons the transportation charges would be **3.6 per ton.** If it is desired to carry back freight over tramway, this could be done without any additional charge except possibly in the matter of power.

As stated by our representative, if our proposition should be favorably received and it was definitely decided to install this method of transportation, we would be pleased to make arrangements for one of our engineers to visit the proposed locations of tramway equipment and make any recommendations necessary for satisfactory and economical operation and installation as well as advising you as to the correct data to furnish for our requirements for making up the necessary estimates and drawings.

There are over three thousand Bleichert Aerial Tramways in successful operation throughout the world—in capacities ranging from a few hundred pounds to two hundred and fifty tons per hour, with lengths of lines varying from a few hundred feet up to twenty-two miles and with operating costs running from 1c to 5c per ton per mile—and from the fact that we have been able to install this number of tramways and give complete satisfaction both as to operation and maintenance, leads us to believe that there is no question but what we could furnish equipments for your requirements which would give you the same service and satisfaction.

We shall, therefore, look forward to hearing further from you with regard to these proposed improvements, and assuring you of our prompt and careful attention to all inquiries, we are,

Yours truly,

AMERICAN STEEL & WIRE COMPANY.

W. E. Corne,

Sales Agent.

EXHIBIT XIV.

Joint resolution memorializing congress in favor of a canal connecting Lake Superior with the Mississippi River via the Brule and St. Croix Rivers, and providing for the appointment of a commission to promote the construction thereof and to act in conjunction with commissions appointed by other states.

WHEREAS, the congress of the United States, by two several and separate acts, passed in the years 1894 and 1899, authorized and directed two separate surveys and examinations of three proposed routes for a canal connecting Lake Superior with the Mississippi River, one of said routes being from Lake Superior to the Mississippi River via the St. Louis River, one via the Rum River and one via the Brule and St. Croix Rivers; and

WHEREAS, after an actual examination and survey of said several proposed routes, the United States government engineers did report in the year 1894 that the most feasible route for said canal is the route from Allouez Bay on Lake Superior via the Brule and St. Croix Rivers to the Mississippi River, and recommended said route; and

WHEREAS, in the year 1899 the United States government engineers did again report that a canal from Lake Superior to the Mississippi River via the Brule and St. Croix Rivers was entirely feasible. That in the first of said reports of said government engineers it was estimated that said canal could be constructed seven feet deep, eighty feet in width at the water surface and fifty-nine feet in width at the bottom thereof, for the sum of seven million fifty thousand dollars; and in the second of said reports it was estimated that said canal could be built eighty feet in width at the water line, fifty-nine feet in width at the bottom and five feet deep, for the sum of six million twelve thousand five hundred dollars; and

WHEREAS, the project of constructing said canal has not been authorized by congress because of reports of said engineers to the effect that the construction of said canal was not warranted owing to existing railroad competition and the cost of said canal as compared with the benefits to be derived from the construction thereof; and

WHEREAS, it conclusively appears from the surveys and examinations of the route made by the government engineers, that it is entirely feasible and practicable to construct and operate said canal along the route specified from Allouez Bay on Lake Superior via the Brule and St. Croix

Rivers to the Mississippi at the junction of the St. Croix and Mississippi Rivers, and the only objections which apparently prevent congress from authorizing said project are the existence of railway competition and the doubt expressed by said engineers as to the amount of commerce which would be carried upon said canal; and

WHEREAS, no survey or examination appears to have been made or authorized by the United States government of said route to ascertain whether the same could be constructed and operated at a depth of ten feet, nor as to whether a canalization of the Mississippi River by the construction of a dam below the junction of the St. Croix and Mississippi Rivers would be practical which would in fact extend said waterway so as to connect the cities of Minneapolis and St. Paul with the cities of Duluth, Minnesota, and Superior, Wisconsin, by means of said canal and the canalization of said Mississippi River; and

WHEREAS, millions of consumers and producers of the Northwest and the Mississippi Valley are vitally interested in the construction of said canal and the improvement of said Mississippi River so as to form a complete and continuous inland waterway from the Mississippi Valley and the Twin Cities to the Atlantic seaport via the Great Lakes, thus enabling all of the products of the eastern states and the states bordering on the Great Lakes to be shipped by water to all points in the Northwest and the Mississippi Valley and the agricultural and other products of the Northwest to be shipped by water to the markets of the world; and

WHEREAS, at all of the hearings held upon the question of the commercial necessity of said canal and waterway a great mass of producers and consumers interested have had no adequate opportunity to be effectively heard and there is no lawfully constituted authority, official or commission of this state authorized or empowered to ascertain and present the facts or collect data and statistics relating to commerce bearing upon this important subject; and

WHEREAS, the State of Wisconsin and the people of said State are also greatly interested in the construction of said canal and waterway; now, therefore

BE IT RESOLVED, by the House of Representatives of the State of Minnesota, the Senate concurring, that the construction of said canal by the national government is of the greatest importance to this State, the State of Wisconsin, the Mississippi Valley and the Nation; that its construction will

be a great national addition to existing facilities of commerce; and it would constitute a natural, adequate and automatic means of reducing transportation rates on all commodities between the Mississippi Valley, the great Northwest, the Great Lakes and the Atlantic seaports, and that it would tend to reduce rates upon coal, iron, steel, manufactured articles, grain and other agricultural products and would greatly benefit the consumers and producers of the East and the West and reduce the cost of the necessities of life.

RESOLVED FURTHER that the governor of this state, the drainage engineer of this state, the chairman of the board of railroad and warehouse commissioners be and they are hereby appointed a commission, of which the governor shall be chairman, which shall be known as the Lake Superior and Mississippi River Canal Commission, and said commission is hereby granted power and authority and is hereby directed to investigate and ascertain all of the facts with reference to practicability and cost of construction and operation of said canal, utility thereof, and the character and amount of commerce which would probably be carried or affected by said canal, and the probable effect of the construction and operation thereof upon transportation rates and upon the consumers and producers of the Northwest, and especially the states of Minnesota and Wisconsin, provided however, that the expenses of such commission in carrying out the provision hereof shall not exceed the sum of twenty-five hundred dollars ($2500.00.) Said commission is hereby directed to lay before the United States engineers, and any other federal commission, board or authority having jurisdiction of any question relating to the construction of said canal by the United States government, all of the facts, conclusions, statistics, data, information and views ascertained and gathered by said commission bearing upon the advisability and practicability of the construction of said canal by the federal government, and to make or cause to be made any and all arguments deemed necessary by said commission in favor of said canal, and to use their best efforts to further the project of the construction thereof, and to report to the legislature at the session of 1915 all of their acts and doings in the premises.

RESOLVED FURTHER, that said commission is also authorized and directed to confer and act with any commission designated or appointed with the State of Wisconsin, or any other State interested in the construction of said canal, and to

act with any such commission in any and all of the matters hereinbefore set forth.

RESOLVED FURTHER, that the State of Wisconsin is hereby requested and invited to constitute and appoint a like commission for the purpose of consulting and co-operating with said commission hereby appointed for the purpose of furthering the project of constructing said canal.

RESOLVED FURTHER, that the senators and representatives in congress of the United States for the State of Minnesota are hereby requested to urge upon congress the adoption of an act authorizing the final survey of said canal at a depth of ten feet, together with the extension of said canal by means of the canalization of the Mississippi River to the cities of St. Paul and Minneapolis, and to urge upon congress the final construction of said canal by the United States government.

RESOLVED FURTHER, that a copy of this resolution be sent to the senate and house of representatives of the United States and to each of the senators and representatives in congress from this State, and that a like copy be transmitted by the governor of this state to the governor of Wisconsin and to the president of the senate and speaker of the assembly of the State of Wisconsin.

Approved March 31, 1913.

EXHIBIT XV.

CHAPTER 651.

AN ACT creating the Lake Superior and Mississippi river canal commission, prescribing its duties; and creating section 172—121 of the statutes, making an appropriation.

THE PEOPLE OF THE STATE OF WISCONSIN, REPRESENTED IN SENATE AND ASSEMBLY, DO ENACT AS FOLLOWS:

Section 1. There is created a commission to be known and designated as the Lake Superior and Mississippi river canal commission. Such commission shall consist of three members to be appointed by the governor within thirty days after the passage and publication of this act.

Section 2. Such commission shall, within forty days after the passage and publication of this act, organize by choosing one of its members as president and one as secretary.

Section 3. It shall be the duty of the Lake Superior and Mississippi river canal commission, hereby created, and said commission is hereby granted power and authority to investigate and ascertain all the facts with reference to the practicability and the cost of construction and operation of a canal from Lake Superior to the Mississippi river via the Brule and St. Croix rivers, the utility thereof for the purposes of creating water power and the character and amount of commerce which would probably be carried or affected by said canal, and the probable effect of the construction and operation thereof upon transportation rates and upon the consumers and producers of the northwest, and especially the states of Minnesota and Wisconsin. Said commission is hereby directed to lay before the United States engineers and any other federal commission, board or authority having jurisdiction of any question relating to the construction of said canal by the United States government, all of the facts, conclusions, statistics, data, information and views ascertained and gathered by said commission bearing upon the advisibility and practicability of the construction of said canal by the federal government, and to make or cause to be made any and all arguments deemed necessary by said commission in favor of said canal, and to use their best efforts to further the project of the construction thereof.

Section 4. The said commission is also authorized and directed to confer and act with any commission or other body

designated or appointed by the State of Minnesota, or any other state interested in the construction of said canal, and to act with any such commission or other body in any and all of the matters set forth in section 3 of this act. Said commission shall, after its organization, notify any such commission or other body designated or appointed by any other state of such organization and its desire to cooperate with such commission or other body, and shall thereafter act as herein provided.

Section 5. Said commission shall report its acts and doings to the governor, from time to time as he may request and shall report to the next session of the legislature all of its acts and doings, with such recommendations for further legislation as it may deem expedient.

Section 6. The members of said commission shall serve without salary, but shall be paid their actual expenses necessarily incurred in the performance of their duties under this act. All payments under this section shall be made on proper vouchers signed by the president and secretary of said commission.

Section 7. There is added to the statutes a new section to read: Section 172-121. There is appropriated on July 1, 1913, the sum of two thousand five hundred dollars, payable from any moneys in the general fund, not otherwise appropriated, for the Lake Superior and Mississippi river canal commission to carry out the provisions of this act.

Section 8. This act shall take effect and be in force from and after its passage and publication.

Approved July 21, 1913.

INDEX

IN THE MATTER OF

Lake Superior and Mississippi Canal

APPEAL OF MINNESOTA
AND WISCONSIN COMMISSIONS

SUPPLEMENTAL DATA AND ARGUMENT

IN THE MATTER OF THE PROJECTED CANAL FROM LAKE SUPERIOR TO THE MISSISSIPPI RIVER VIA THE BRULE AND ST. CROIX RIVERS.

SUPPLEMENTAL STATEMENT

Should the Lake Superior-Mississippi River Canal be constructed by the United States?

It is conceded that the answer to the foregoing question depends upon the favorable solution of two problems:

1. Is it physically practicable to construct and operate such canal?

2. Is the proposed canal commercially feasible?

IT IS ENTIRELY PRACTICABLE TO CONSTRUCT AND OPERATE THE CANAL.

It was freely conceded by the local board of the United States Army Engineers that it is easily practicable and feasible from a physical and engineering standpoint to construct and operate the canal. This conclusion of the local board rests upon the authority of all United States government engineers who have examined the proposed route, its physical characteristics water supply, etc. Not only is the construction and operation of the canal **feasible and practicable, but it presents no unusual or difficult engineering or operating problem.**

COMMERCIAL FEASIBILITY.

Is the proposed canal commercially feasible, or, as this problem is stated by the local board, will the operation of the canal result in saving the public in reduced freight rates

$420,000.00 per annum?

This problem presents the following factors:

1. At what rate will the canal carry freight?

2. What amount of tonnage will be available for canal transportation in 1920 when the canal will be ready for operation?

3. Will the construction of the canal result in a saving on freight rates between the head of the lakes and Twin City territory?

4. Will the total saving equal $420,000.00 per year?

CANAL RATE.

We have shown in our original argument (pages 66-71) that on the Erie Canal, operating under extremely unfavorable conditions as to cost of transportation, such as failure to keep canal in repair, resulting in reduced depth of channel; use of ancient type of canal boat—maximum 240 ton capacity—with animal motive power; entire absence of modern terminal facilities; canal traffic controlled by railways, preventing canal from securing through freight; it was during a period when improvement in type of barge or character of motive power could not be made because the fate of the canal was uncertain,—the average rate was two mills per ton mile.

We have shown in our original argument (p. 106) that with the favorable conditions that would necessarily obtain at the time of the opening of the projected canal (p. 121) including modern terminals with adequate facilities for handling freight, self propelled modern type of canal boat having capacity of 550 tons, canal free from railway domination or control, the rate for the projected canal should be much less than two mills per ton mile on the average and that upon coal it should not exceed 1½ mills per ton mile,—one authority, John H. Bernhard, placing the coal rate as low as 25c per ton

We therefore confidently assert that it is safe and conservative to conclude that the average rate on the projected canal would not exceed two mills per ton mile, especially in view of the immense volume of tonnage hereafter shown to be available to the canal at the moment it is ready to operate.

Coal can be and will be carried on the canal at 1½ mills per ton mile at the highest.

UNWARRANTED EXTRA HANDLING CHARGES OF FREIGHT TRANSPORTED BY CANAL USED BY LOCAL BOARD TO DEFEAT COMMERCIAL FEASIBILITY OF CANAL.

In their comparison of the respective costs of transportation via rail and canal, the local board not only assumes an average canal rate of 3 mills per ton mile or 78c per ton,—which is 28c per ton in excess of the rate calculated at two mills per ton mile—which we have shown to be the proper rate—but in addition thereto, in order to make a finding that it is impossible to transport any freight on the canal, the board adds to the canal rate various handling charges for which there is little, if any, basis in fact, such as 25c per ton for unloading coal from canal barge to dock by clam shell, 25c per ton deterioration, 25c per ton for delivery from dock to carload consumer; elevator charges on grain at Twin Cities 25c, and at Duluth 25c per ton; handling charge on flour at Duluth 22c to 33c per ton; handling charge for general merchandise 25c per ton; the same on iron and steel; 44c per ton on coarse grain at Duluth.

As shown in our original argument, most of the foregoing charges do not exist and there is no reliable commercial, or other authority, for them. It only costs 5c per ton to take coal from lake vessels, put it on the dock, screen it and load it into cars. This operation can be done as cheaply at the Twin Cities. See testimony of Julius Barnes hereinafter quoted, also statement (p. 42 report of local board.) Deterioration of coal in one handling by clam shell is too small to be commercially noticeable (p. 101 original argument.) Elevator charges on grain at Twin Cities and Duluth must be paid whether transported by rail or canal; handling charges on flour at Duluth must be paid when carried by rail and transferred to lake vessel and such charge with modern terminals should not exceed 6c per ton. General merchandise handling charge should not exceed 6c to 10c per ton.

TRANSPORTATION BY CANAL INVOLVES AT MOST ONLY ONE EXTRA HANDLING CHARGE.

Any fair comparison of the various operations necessary in the transportation of commodities from the Great Lakes to the Twin Cities, or vice versa, between canal and rail transportation, demonstrates that at the most there can be but one additional handling of freight in canal transportation that is not also required in rail transportation of the same commodity.

Take the case of coal, for instance. The only additional handling of coal in order to deliver the same to Twin City consumer when transported by canal, is to take coal from lake carrier and place it in canal barge. When the coal reaches the Twin Cities it occupies exactly the same relative position to further transportation as the same coal did originally when in the hold of the carrier at Duluth. It must be taken from the barge by coal handling machinery and deposited in adjacent coal yard or loaded into cars in exactly the same manner as would be necessary at Duluth. So that such coal is properly chargeable with only the cost of taking the coal from lake carrier and placing it on the barge. This can be done by elevating the coal to a coal pocket in the dock with a chute running down suitable to deliver coal by gravity to barges as called for. Figures are given for the cost of this operation ranging from 3c to 6c per ton. (P. 91.) We think it is conservative to add a charge of 5c.

When coal is transported from Duluth to the Twin Cities by rail at present it is delivered on sidetrack to carload consumer without additional switching charge, although under recent rulings of Interstate Commerce Commission undoubtedly shippers in the near future will be required to pay an extra charge for similar switching. A small proportion (but not over 50%) of Twin City consumers take coal in carload lots on sidetrack. A switching charge from dock to sidetrack of $2.00 per car would cover such consumption, making a net charge of 2½c per ton on all coal shipped. However, all coal shipped from Twin Cities to southern, southwestern Minnesota

and South Dakota points would not carry the extra 2½c per ton.

As to grain shipped from the Twin Cities to Duluth, practically none is cleaned at country elevator points and therefore upon receipt at Twin Cities goes into elevators to be cleaned and mixed with other grain to give it a higher grade. Once being in an elevator at the Twin Cities, whether it is shipped via rail or canal, makes no difference in the elevator charge. All grain going into elevators in the Twin Cities will take the same charge whether delivered from the elevator to cars or canal boats. To charge grain for an extra handling at the Twin Cities is unwarranted except as to the small proportion thereof which is not placed in an elevator at the Twin Cities.

From the statement of the local board it would appear that grain transported by canal to Duluth would take an extra elevator charge at Duluth for being transferred from canal boat to lake carrier and that such elevator charge would not also be applicable to grain transported by rail. **This is absolutely inaccurate and is not and cannot be justified from any standpoint or by any authority.**

ALL GRAIN ARRIVING AT DULUTH BY RAIL MUST PAY THE ELEVATOR CHARGE FOR BEING TRANSFERRED TO LAKE VESSEL.

FLOUR.

Flour is now loaded by hand trucks from mill to car and the local board makes no charge against rail on this account. Flour can be loaded from mill to canal boat at a cost no greater than the present cost of loading cars.

All flour shipped by rail to Duluth is charged 16c per ton for transfer from car to lake vessel. As will be hereafter seen, flour can be handled by modern terminal facilities from canal boat to lake vessel for 6c per ton.

General merchandise is charged 25c per ton extra for delivery from lake vessel to canal boat. This charge should not exceed 6c per ton, as shown by the testimony of Julius Barnes

hereinafter quoted, and by reference to similar charges at New Orleans and San Francisco hereinafter quoted.

If proper terminals are provided at each end of the canal, it is clear that freight transportation via canal involves only one extra handling and that the canal with modern terminals will reduce all handling charges of freight between the lakes and the Twin Cities from the present rates as well as reducing the present rail rates.

Therefore, in any comparison of rail and canal transportation, only one handling charge should be added to the canal rate, and, as seen, the effect of canal construction with its modern terminals would be to more than offset the present handling charges by rail.

The testimony of Julius Barnes hereinafter quoted shows that present handling charges from lake vessel to car or car to lake vessel on general merchandise is from six to fourteen times more than will be the case when the canal is built and modern terminals installed. Then handling charges involved in rail transportation will be much higher upon all commodities, except coal and grain, than like handling charges in connection with canal traffic. So that assuming the construction of modern terminals in connection with the canal—and we guarantee such construction—practically all of the handling charges assumed by the local board will be eliminated. Indeed there will be a net reduction in the handling charges unless similar terminals are also constructed at Duluth for transfer from lake to rail, and in such event the handling charges to be debited to the canal, as compared with rail, will be too small a factor to affect the problem.

AVAILABLE TONNAGE.

The local board found from railway statements (Sec. 31) that the actual coal, iron and flour shipments in the year 1912 were as follows:

Coal and iron	1,954,568 tons.
Flour	223,170 tons.
Total	2,177,738 tons.

The board accepted as true the railway statement that the above constituted eighty per cent of the total freight shipments for 1912. Therefore the board must have found the total **actual shipments** for 1912 to be 2,722,171 tons. (See Sec. 32-40.)

The board then made an estimate of the tonnage to be added to the actual shipments for 1912 by adding certain percentages to the actual shipments of coal, iron, flour, etc., on account of the added consumption of the canal zone and territory tributary thereto. The result of such computations were that the board found the total **actual and estimated tonnage** available to the canal for 1912 to be 3,295,000 tons (Sec. 41.) It will be seen therefore that the board added to the total **actual shipments** 522,829 tons for the amount they estimated the shipments should be increased on account of increased territory. This was an addition of 20.3% to the actual tonnage for 1912 according to railway statistics.

As shown by the statement of the railways to the Minnesota Railroad and Warehouse Commission (p. 15 original argument) the **correct actual total tonnage** for the year 1912 was 3,484,163 tons. Following the exact method followed by the local board in order to arrive at the **total actual and estimated tonnage** available for shipment on the canal in the year 1912 would require the addition of 20.3% to the total actual shipments for 1912, or 707,285 tons.

This would give us, according to the method of the local board, a total, **actual and estimated,** of 4,191,448 tons available to the canal for the year 1912.

Dividing this total according to the methods applied by the local board (Sec. 41) we have:

	Per cent.	Tons.	Present Rail Rate.
Soft coal	52.3	2,192,127	$0.96
Hard coal	20.	838,290	1.20
Iron and steel	.1	4,191	1.40
Flour	7.6	318,550	1.16
Grain	10.	419,145	1.00
General Mdse.	10.	419,145	1.16
		4,191,448	

Note:—The rates on soft coal and flour increased from 90c

and $1.00 to above figures since the report of the local board; rate on hard coal decreased from $1.25 to $1.20.

It appears from the reports of the railways to the Minnesota Railroad and Warehouse Commission, as shown on page 15 of the original argument, that shipments between canal termini have increased since 1909 at the rate of 15% per annum. If such increase continues until 1920 it would make an increase over the year 1912 of 120%. This would increase the total tonnage available in 1920 to 9,221,285 tons, which, divided according to the percentages applied by the local board above noted, would show the following result:

	Per cent.	Tons.
Soft coal	52.3	4,822,732
Hard coal	20.	1,844,257
Iron and steel	.1	9,222
Flour	7.6	700,818
Grain	10.	922,128
General Mdse.	10.	922,128

It is not unreasonable to assume that the available tonnage will increase at approximately the same rate of increase noted between the years 1909 and 1913, but we find that if such rate of increase be discounted one-third nevertheless the total tonnage available cannot possibly fall short of eight million tons. This would seem to dispose of the question of total tonnage available to the canal at the time it may be expected to be ready for business. Therefore it is beyond question or doubt that the volume of tonnage available to the canal when constructed will be sufficient so that at the canal rates herein shown there will be a saving to the public of a great deal more than $420,000.00 per annum, and the canal is commercially feasible.

CEMENT.

It is stated upon reliable authority that the first unit of cement production at the new steel mills in Duluth will provide for a production of one million tons per annum and unquestionably the Twin Cities and territory included in the canal zone will use cement manufactured at the head of the Lakes. Other factors noted in the original argument pp. 62-66 will tend rather to increase the total tonnage available rather than to decrease it, so it is conservative to estimate that the

above totals will be increased rather than decreased.

THE CANAL IS COMMERCIALLY FEASIBLE ON THE BASIS OF THE 1912 ACTUAL AND ESTIMATED TONNAGE.

COAL.

We have seen that on the basis of total and actual shipments for 1912 the total coal available would be.

Soft coal	2,192,127 tons.
Hard coal	838,289 tons.

Rail Rate.

Soft coal	$0.96	
Hard coal	1.20	
Assuming the canal rate to be 1½ mills per ton mile	$0.37½	per ton.
Unloading lake carrier and loading barge	.05	per ton.
Delivery to side track or carload consumers (only small part, not exceeding 50% so delivered—cost 5c per ton on 50%)	.02½	per ton.
Total cost per ton via canal	$0.45	

Saving to public:

Soft coal, 51c per ton	$1,117,984.77
Hard coal, 75c per ton	628,716.75
Total saving on coal	$1,746,701.52

Assuming the canal rate to be 2 mills per ton mile	$0.50	per ton.
Unloading lake carrier and loading barge	.05	per ton.
Delivery	.02½	per ton.
Total cost per ton via canal	$0.57½	

Saving to public:

Soft coal, 38½c per ton	$843,968.89
Hard coal, 62½c per ton	523,930.62
Total saving on coal	$1,367,899.51

Assuming the canal rate to be 2½ mills per ton mile	$0.62½	per ton.
Unloading lake carrier and loading barge	.05	per ton.
Delivery	.02½	per ton.
Total cost per ton via canal	$0.70	

Saving to public:

Soft coal, 26c per ton	$569,953.02
Hard coal, 50c per ton	419,144.50
Total saving on coal	$989,097.52

Assuming canal rate to be 3 mills per ton mile	$0.75	per ton.	
Unloading lake carrier and loading barge	.05	per ton.	
Delivery	.02½	per ton.	
Total cost per ton via canal	$0.82½	per ton.	
Saving to public:			
Soft coal, 13½c per ton			$295,937.14
Hard coal, 37½c per ton			314,358.37
Total saving on coal			$610,295.51

FLOUR.

Total flour available 1912, 318,550 tons; rail rate $1.16.

Assuming canal rate to be 1½ mills per ton mile	$0.37½	
Mill to barge	.036	
Unloading and loading at Duluth	.08	
Total cost per ton via canal	$0.491	
Saving to public:		
318,550 tons at $0.669 per ton		$213,109.95
Assuming canal rate to be 2 mills per ton mile	$0.50	
Mill to barge	.036	
Unloading and loading	.08	
Total cost per ton via canal	$0.616	
Saving to public:		
318,550 tons at $0.544 per ton		$173,291.20
Assuming canal rate to be 2½ mills per ton mile	$0.625	
Mill to barge	.036	
Unloading and loading	.08	
Total cost per ton via canal	$0.741	
Saving to public:		
318,550 tons at $0.419 per ton		$133,472.45
Assuming canal rate to be 3 mills per ton mile	$0.75	
Mill to barge	.036	
Unloading and loading	.08	
Total cost per ton via canal	$0.866	
Saving to public:		
318,550 tons at $0.294		$93,653.70

Note:—A charge of 3.6c per ton is added for delivery of flour from mill to barge which should be offset by present cost of loading from mill to car. Also 8c per ton from canal boat to lake carrier is 2c per ton more than warranted by testimony of Julius Barnes, San Francisco and New Orleans charges.

GENERAL MERCHANDISE.

Total general merchandise available, 419,145 tons; rail rate $1.16.

Assuming canal rate to be 1½ mills per ton mile	$0.37½	
Handling charge, boat to barge	.10	
Total cost per ton via canal	$0.47½	
Saving to public:		
419,145 tons at $0.68½ per ton		$287,114.32
Assuming canal rate to be 2 mills per ton mile	$0.50	
Handling charge, boat to barge	.10	
Total cost per ton via canal	$0.60	
Saving to public:		
419,145 tons at $0.56 per ton		$234,721.26
Assuming canal rate to be 2½ mills per ton mile	$0.62½	
Handling charge	.10	
Total cost per ton via canal	$0.72½	
Saving to public:		
419,145 tons at $0.43½ per ton		$182,328.07
Assuming canal rate to be 3 mills per ton mile	$0.75	
Handling charge	.10	
Total cost per ton via canal	$0.85	
Saving to public:		
419,145 tons at $0.31 per ton		$129,934.95

VOLUME OF GENERAL MERCHANDISE.

Julius Barnes, traffic expert, who made a statement to the local board, estimates in his statement before the House Committee on Merchant Marine hereinafter referred to that the volume of general merchandise traffic on the Great Lakes would increase ten fold if handling charges from boat to rail and from rail to boat were made to conform to average charges at New Orleans and San Francisco where modern terminals have reduced handling charge on freight to an average of five to six cents per ton.

GRAIN.

Rail rate, $1.00

Assuming canal rate to be 2 mills per ton mile	$0.50 per ton.

Elevator charges, Twin Cities..... .25 per ton.

Total cost per ton via canal..$0.75

Saving to public:

419,145 tons at 25c $104,786.25

Assuming canal rate to be 1½ mills per ton mile $0.37½

Elevator charges ..... .25

Total cost per ton via canal..$0.62½ per ton.

Saving to public:

419,145 tons at 37½c $157,179.38

The statements of the local board in Sections 70-76 relative to grain would indicate that elevator charges at Duluth should be added to the canal rate; but this is absolutely incorrect. All grains going to Duluth by rail must pay elevator charges at Duluth in addition to rail rate. There is no lake and rail rate on grain.

Unquestionably a much greater grain tonnage will be shipped via Duluth after the construction of the canal on account of lower rate.

SUMMARY OF SAVING ON BASIS OF ACTUAL AND ESTIMATED SHIPMENTS FOR THE YEAR 1912.

At Various Canal Rates per ton mile.

	3 mills.	2 mills.	1½ mills.
Coal	$610,295.51	$1,367,899.51	$1,746,701 52
Flour	92,653.70	173,291.20	213,109.95
Grain		104,786.25	157,179.38
General Mdse. ..	129,934.95	234,721.20	287,114.32
Iron and Steel...	2,305.05	3,352.80	3,876.68
Total....	$836,189.21	$1,884,050.96	$2,407,981.85

Therefore it appears that even on the basis of the available tonnage for the year 1912, the canal is commercially feasible in that it will save more than $420,000.00 per year. But we have seen that the available tonnage is increasing at the rate of 15% per annum; that it is improbable to suppose that the canal could be completed until 1920. It is therefore conservative and reasonable to add 120% to the figures of the savings shown for 1912, which gives the following total saving:

At Various Canal Rates per ton mile.

	3 mills.	2 mills.	1½ mills.
Coal	$1,342,550.12	$1,641,479.41	$3,842,743.34
Flour	203,838.14	381,240.64	468,841.89
Grain		230,529.75	345,794.63
General Mdse.	285,856.89	516,386.64	631,651.50
Iron and Steel	5,071.11	7,376.16	8,528.69
Total	$1,837,316.26	$2,777,012.60	$5,297,560.05

CRITICISM OF METHODS OF LOCAL BOARD IN DETERMINING CANAL NOT COMMERCIALLY FEASIBLE.

We assert that the method used by the local board in Section 45 of their report, for the purpose of discussing the commercial availability of the canal, is productive of nothing but confusion. In this connection the local board say:

"For the purpose of discussion several cases will be assumed: (1) that the canal operating for seven months of the year will carry all the present freight or 3,295,000 tons; (2) that the canal will carry 50 per cent of the entire freight, or, 1,647,500 tons; (3) that the canal will carry 18 per cent of the entire freight as the Erie Canal did in 1880, or 593,100 tons; (4) that the canal will carry 3 per cent of the entire freight as the Erie canal did in 1906, or 98,850 tons; (5) that the canal will carry all freight except coal; (6) that the canal will carry all freight except soft coal; (7) that the canal will carry all grain and flour northward and all hard coal southward.

"(a) Cost to the United States.—The canal to be commercially justified must save to the public at least $420,000 per annum, an amount equivalent to a reduction of the selling price of the freight handled under the various conditions, as follows:

(1)	3,295,000 tons	$0.13
(2)	1,647,500 tons	.25
(3)	593,000 tons	.71
(4)	98,000 tons	4.25
(5)	912,800 tons	.46
(6)	1,571,000 tons	.27
(7)	1,239,100 tons	.34

Not one of the entire seven assumed cases set forth by the local board in this portion of their report has any application whatever to the problem of the commercial feasibility of this particular project.

As to the first case it assumes that the canal will carry all freight. We do not claim it. We claim it will affect all freight rates by materially reducing them.

As to the second case that the canal will carry 50% of the entire freight, there is no basis for us to claim that percentage more than any other.

As to the third and fourth cases. There is no possible basis for the assumption that the canal will carry 18% of the entire freight as the Erie Canal did in 1880, nor that it will carry 3%, as the Erie Canal did in 1906.

Neither is there any basis for the assumed case that the canal will carry all freight except coal. This case is the most unfavorable to the canal that could be assumed because, as shown in our original argument, coal, both hard and soft, is peculiarly adapted to transportation by canal; that it forms 90% of the tonnage on some of the most important canals in Europe. If the proposed canal will not carry coal it will not carry anything, and to assume a case that the canal will carry all freight except coal is absolutely unfair to the canal. The importance of coal to the commercial feasibility of this canal is demonstrated by the actual figures hereinbefore quoted.

That the canal will carry all freight except soft coal is likewise, and for the same reasons given last above, unfair to the canal. If the canal will not carry soft coal at a saving it probably is not commercially feasible.

For the reasons above given with reference to the other cases assumed, the last case assumed by the local board that the canal will carry all grain and flour northward and all hard coal southward, is absolutely unfair. It is wholly artificial and the whole method of dividing the canal tonnage into the assumed cases mentioned in Section 45 is artificial, without any basis or foundation in fact, and is a method of reasoning wholly unsuitable and inconclusive as to the problem presented. It is on a par with the statement of the local board at Sec. 65 of their report that coal used for Government purposes will not move by the canal because there is a land grant rate of 50% on Government freight.

FAIR METHOD OF DETERMINING COMMERCIAL FEASIBILITY.

The only fair and reasonable method of determining the commercial feasibility of the canal is to determine the total available tonnage at the time the canal is completed, divide the tonnage so found into the various classes, such as soft coal, hard coal, iron, steel, cement, flour and general merchandise; ascertain the rail rate upon each such commodity and find the total freight paid at the present time to the railways. Then ascertain the canal rate as to each item and commodity to be transported; if there be a saving, subtract it from the rail rate and multiply it by the tonnage as to each commodity, and if the total saving equals $420,000.00 per annum, or if such amount should be found to equal the interest and maintenance charges, then the canal should be determined to be commercially feasible.

The local board also seem to be inclined to credit the canal with freight actually transported on the canal and not to credit the canal with any saving in any instance when the freight is transported by rail, even though carried at less than present freight rates, notwithstanding the reduction in freight rate be caused solely by the canal. We cannot agree with this theory. It is our contention that if the canal can haul any commodity at less than present rail rates this necessarily results in a public saving of the difference between present rail rates and canal rates and that the canal should be given credit for the whole amount saved on such freight moving in canal territory, whether the same be actually carried by canal or partly by rail or wholly by rail. It is quite possible and perhaps probable that the railways will meet canal competition by making rates which will be so low as to be non-compensatory as to the railways. It is not the object of the canal merely to reduce freight rates, but it is the bona fide object and purpose of such canal to actually transport freight at a considerable reduction from present freight rates and effect a large public saving. How is it possible for us to guess at what the railways will do when the canal demon-

strates its ability to haul freight at less than existing rail rates? The question which lies at the root of the construction of the canal is whether such construction will result in saving to the public a large amount of money each year by reason of the fact that water transportation via canal is essentially and inherently more economical and cheaper than rail transportation. If such be the fact and the difference between rail and canal transportation per ton is sufficient when multiplied by the total tonnage so that the investment of the United States government is a profitable one from the standpoint of public saving, it seems to us that the question of what the railways may do about reducing their rates or may undertake by other methods to meet or destroy canal competition is entirely outside of the present problem. That is a problem which properly addresses itself to Congress and to the executive authority for solution. We judge from the present temper of public opinion and from the investigations made by committees of Congress and from the present trend of legislation, that the question will be solved in such a way as to permit waterways to carry on their natural and normal functions.

WE THEREFORE SUBMIT THAT THE CANAL SHOULD BE CREDITED WITH ALL REDUCTIONS IN FREIGHT FROM EXISTING RAIL RATES CAUSED OR PRODUCED BY THE CONSTRUCTION AND OPERATION OF THE CANAL, WHETHER SUCH FREIGHT IS ACTUALLY CARRIED ON THE CANAL OR OTHERWISE.

ELEVATOR CHARGES AT DULUTH ON GRAIN SHOULD NOT BE ADDED TO CANAL RATE.

Statements of the local board in reference to handling charges on wheat and coarse grains, found in Section 70 to 76 inclusive, and at Section 89, where such elevator charges are added to the canal rate on wheat and coarse grains producing a rate so high that neither wheat or grain will move via the canal, are misleading. Such statements are made in a manner which might induce the belief that shipments of grain from

the Twin Cities via Duluth to Buffalo are made on a lake and rail rate and that the rail rate of $1.00 per ton to Duluth includes elevator charges at the Twin Cities and Duluth and transfer of grain to lake carrier at Duluth. The fact is there is no lake and rail rate on wheat or grain from the Twin Cities to Buffalo or New York or other eastern points. Every shipment of wheat or grain from or through the Twin Cities or elsewhere to Duluth and to the east via the Great Lakes must pay in addition to the rail rate of $1.00 per ton from the Twin Cities to Duluth and in addition to freight charged on lake steamer the elevator charges at the Twin Cities and at Duluth and Buffalo.

INCREASE IN GRAIN SHIPMENTS.

If our statement is right that the canal rate will not exceed two mills per ton mile on grain, the rate from the Twin Cities to Duluth should be fifty cents per ton, or 1½ cents per bushel less than the present rail rate of three cents per bushel. There will be a proportionate reduction in grain rates from all Mississippi River points. And whereas under present conditions and rates there have been large exports of wheat and grain from the Twin Cities and Twin City territory to easterly points via Duluth; the decreased canal rate will necessarily increase the area from which such shipments will move which will logically result in a very greatly increased volume of such grain shipments.

With the completion of the Erie Canal in 1915 or 1916 the grain outlet from Duluth to the seaboard will be all water and entirely free from railway control, resulting in a cheaper rate from Twin City and Mississippi River territory to the seaboard. This factor will largely increase the area tributary to the Twin Cities and Mississippi River from which grain will move east via Duluth, and proportionately enlarge the volume of grain available for canal shipment.

FLOUR.

The rail rate quoted on flour by the local board from Minneapolis to Duluth is $1.00 per ton, but the Railroad and

Warehouse Commission of Minnesota, on June 27, 1914, since such rate to be $0.058 per hundred or $1.16 per ton.

In arriving at the conclusion that the canal will not carry flour (Sec. 81) the local board say it will cost 22c per ton to transfer flour from barge to steamer at Duluth, which, added to the canal rate of 78c, leaves nothing for public saving. In section 81 the local board states the cost of such transfer of flour as 33c per ton. The local board then state:

> "The vessels carrying flour on the Great Lakes are railroad owned; the railroads need flour as freight, particularly in winter; they are convenient to the mills at Minneapolis and the docks at Duluth; and who can be so filled with optimism as to believe that flour would be transported by canal to Duluth and there received on equal terms by railroad-owned vessels even if the canal rate could compete with the railroad rate? * * * the railroad-owned steamer in Duluth is not going to make it easy for the independent barge owner who has hauled the freight naturally belonging to the railroads. Much flour now goes to the shores of Lake Michigan for shipment east, being hauled over roads in which it is stated the **mills are interested**. It is believed that it would require a great reduction in freight rates to make the flour mills desert the railroads and the canal cannot bring about this reduction. The flour mills cannot be blamed for desiring to favor the railroads as they would be absolutely dependent upon them five months in the year if the canal were built."

By adding the handling charge of 22c to canal rate of 78c assumed by the local board, in connection with the above statement, the local board conclude the canal cannot carry flour.

It is obvious that if the handling charge of 22c to 33c per ton is excessive and it is practical to reduce it to five or six cents per ton, the conclusion of the local board is without foundation. Of course the canal rate stated by the board of 78c is at least 28c too high.

But in connection with the excessive character of the handling charge particularly we earnestly invite the attention of the general board to the testimony of Julius H. Barnes,

chairman of the traffic committee Duluth Chamber of Commerce, found in Vol. 2 of the hearings of the House Committee on Merchant Marine under date Jan. 31, 1913, at pages 839 to 863 inclusive. The testimony of Mr. Barnes is vitally pertinent and valuable because at the hearings of the local board on Jan. 15, 1913, he appeared in opposition to this canal project and it is in part upon the strength of statements made by Mr. Barnes to the local board that the latter concluded this project not commercially feasible. We should like to quote Mr. Barnes' testimony in full and to reproduce his written statement filed in connection therewith, because in our opinion it presents one of the best arguments we have seen in favor of the construction of this canal. Mr. Barnes testifies particularly with reference to traffic conditions and handling charges on package freight, flour and general merchandise. With reference to handling charges he says, on page 844:

> "They have electrically equipped coal docks that will take coal out of a boat and carry it across and deliver it right onto the waiting railroad car, for distribution, at a cost of not more than 3 or 4 cents per ton, and it often costs less than that. This method handles freight cheaply at both ends, but not package freight, for which we **are paying the same as we did 40 years ago, a transshipping charge of 30, or 40, or 50, or even 60 cents on merchandise per ton at each end.**
>
> "Mr. Humphrey. How about your terminal facilities? Are those under the control of the railroad?
>
> "Mr. Barnes. Ours are; yes, sir.
>
> "Mr. Wilson. What would you suggest as a means of remedying that?
>
> "Mr. Barnes. This is what I would suggest: I think the government should build and lease and operate on the Lakes proper modern terminals for package freight. I do not believe the railroads will ever do it. I do not believe individual enterprise can do it as long as the present conditions exist."

In his written statement, with reference to excessive handling charges, on page 861, Mr. Barnes says:

> "How can it be corrected? San Francisco is cor-

recting it by installing modern unloading and handling apparatus, which will economically handle general freight from and to a steamer. We understand they have fixed a charge there, which covers their operating expense, **at 5 cents per ton.**

"New Orleans has done something of the same sort, and we understand their charge is **6 cents per ton** for that service. On the Great Lakes the regular scale for taking commodities from the steamer and landing them simply on the dock runs from **21 to 40 cents per ton**; and to take it from the dock again and put it in the car, **12 to 30 cents per ton more.**

"The new electrically equipped coal docks in Duluth, operated by coal companies for the reduction of their own expenses, take coal from the hold of a steamer, carry it across the dock, and load it into a waiting car at a cost of **3 to 4 cents per ton.** The same service on general freights through a railroad freight house would cost **33 to 65 cents per ton,** and if it must be stacked in the freight house and piled, because for any reason it cannot make a direct transfer, the charge runs easily **5 to 15 cents per ton additional.** Put this charge on each end of the Great Lakes in handling general merchandise and see how far away from the Lakes at each end this cumbersome and unnecessary transshipping charge reflects to the aid of competing rail lines.

"Of course they will keep it as high as they can. Of course they will make the transshipping of freight from a railroad to vessels just as high as can be excused and maintain it for just as long as possible.

"The elimination of an unnecessarily high shipping charge is not the only economy to be attained by the application of modern methods to lake transshipping. Here is a comparison: One grain elevator at the head of the lakes has a record of loading into vessels in one 10-hour day 1,250,000 bushels of grain; one ore dock at the head of the lakes has a record of having loaded into a steamer 9,456 tons of ore in 25 minutes; one coal dock at the head of the lakes has a record of having unloaded from a vessel onto its docks, in 10 hours and 20 minutes, nearly 9,000 tons of coal.

"In package freight, if conditions are very favorable, three days are sufficient to unload 3,500 tons of general freight, but usually more would be required.

while for loading the more uniform freight east bound of mill stuffs 5,000 tons could be loaded in from two to three days. Somebody is paying for all that idle time of the package freight boat."

The substance of Mr. Barnes' testimony that present handling charges on general merchandise package freight, including flour is from 6½ to 14 times too much. In other words, that it should be 5c to 6c and that it runs from 33c to 70c per ton.

He testifies and clearly shows that these handling charges are solely occasioned by reason of the fact that since 1890 the railroads have owned practically all the through boat lines from Duluth and Chicago to Buffalo and eastern lake ports. That they have made no improvements over the old time gang plank methods of loading and unloading freight; that they have failed to install modern terminals and facilities for loading and unloading freight for the express purpose of preventing such freight from going on the lake and diverting it to all rail routes. He shows that the railroads, through their ownership of lake vessels, have constantly increased lake rates until the difference between lake rates or lake and rail rates and all rail rates is so small as to induce shippers to ship all rail, there being not sufficient saving on the lake route to warrant such shipments. Thus it is seen that railway control and high handling charges deprive the purchaser and consumer of the benefit of low rates on the lakes. That the only low freight rates on the lakes are rates on coal, iron and grain and such rates are low only because independent boats owning their own docks, elevators and coal and ore loading and unloading facilities, are thus beyond railway control.

Mr. Barnes shows rather conclusively that with the exception of coal, iron ore and grain the lake transportation upon which the government has expended more than one hundred million dollars is of no particular benefit to the public by way of reduced freight rates. Particularly is this true of communities situated at a distance of one hundred to one hundred and fifty miles from the lakes, as in the case of

Minneapolis. Mr. Barnes shows that with modern terminal facilities on lake ports the freight on flour from Minneapolis to eastern points should be reduced 20c per barrel (p. 863.)

Mr. Barnes proposes in his testimony and statement that the government should build and lease or operate on the lakes modern terminals for package freight. He does not believe individual enterprise can do it under present conditions. He estimates that the amount of general merchandise handled on the lakes with proper terminals would be increased ten fold. (p. 846.)

As to the effect of modern terminals and reasonable charges, we again quote from Mr. Barnes' testimony (p. 862):

> "Now, when the railroad interest is, as we have shown, directly opposed to improving those handling facilities, when the record of 40 years shows that they will make no attempt to improve those facilities, when the record of 30 years shows that every saving the government gives them, with other independent carriers, the benefit of in the way of improving carrying capacity by larger channels and better navigation facilities will not be reflected in lower rates but in higher on all the traffic that they can control and monopolize, then we believe it is time for the general government itself to take strong and efficient action."

We endorse all of the statements made by Mr. Barnes in his testimony and in the statements referred to. We think the weight of authority and practical experience is in line with the foregoing statements and that the transshipping charges at Duluth on flour and on general merchandise, and in fact on all the commodities which could be transported on the canal, should not average to exceed 6c per ton. We agree that if railways are permitted to monopolize terminals there can be no freedom of water transportation and to bring about conditions fair to the public there must be access to modern terminal facilities by all boats on like terms. Arguments are not going to produce terminals but the pressure of economic necessity of reducing cost of transportation is going to produce terminals which will give the service suggested by Mr. Barnes and

reduce charges to a reasonable amount per ton—say on an average of 6c or 7c. With such terminals the canal will transport flour. We do not ask the United States government to construct terminals at Duluth or St. Paul. We insist that it is the province of the localities as well as their duty to provide the proper terminals. We have seen that water transportation on the lakes, as well as elsewhere in the United States and the world, may be rendered practically useless without proper terminals.

RAILWAY MONOPOLY ON GREAT LAKES.

It appears that the railways have a monopoly of transportation upon the Great Lakes, with the exception of coal, iron ore and grain; that with reference to grain they are rapidly acquiring a monopoly. That the public receives no benefit from the vast amount of general merchandise, flour, manufactured articles, etc., which should be carried upon the lakes, in such a manner as to materially reduce their cost to the consumer. The public which is deprived of this benefit of water transportation has borne its share of the burden of taxation to provide the improvements on the Great Lakes from which they have a right to demand and expect a dividend by way of reduced freight rates.

The construction of this canal, with adequate terminals, will furnish the necessary means of **destroying the monopolistic grip of the railways** because it will furnish, in connection with the Great Lakes and the Erie Canal, a through water route from the seaboard to the cities of St. Paul and Minneapolis and the Mississippi River entirely free from railway manipulation or control. The construction of terminals for the canal will force the Duluth and Superior people to build adequate and free terminals at the Lake Superior terminus of the canal because otherwise the canal and its terminals, St. Paul and Minneapolis, would receive freight so much cheaper than Duluth and Superior as to deprive the latter of commercial territory now available to it.

ADVANCES OF LAKE AND RAIL RATES.

We invite the attention of the general board to the statement of the lake and rail rate history and present situation as contained in a statement thereof made by the commercial bodies of St. Paul and Minneapolis filed with this board on June 30, 1914, and to our original argument. P. 45-6.

SUMMARY.

In the original argument and this supplementary statement we have completely answered and overcome all of the objections and obstacles to the commercial feasibility of the canal suggested or contained in the report of the local board, as follows:

To the objection of the local board that the waterways and canals of the United States are decadent and dying out and that the fate of this canal, if constructed, would be to lie idle and be abandoned, we have shown that the reason why canals have been abandoned in the past and why our great rivers are not carrying as much commerce as they should is due solely to the fact that railway interests have been permitted to obtain a monopolistic grip upon waterway transportation by various methods similar in character to the methods employed by the great trusts and combinations in throttling competitors and which are now clearly recognized as unlawful and which in the future will not be permitted. These methods are fully set forth in our original argument (p. 21 to 62) and need not be rehearsed here. With reference to canals their history shows that most of those which have been abandoned were actually purchased, owned or controlled by railways for a long period before they became useless for commercial purposes and that in practically every instance it was through intentional neglect of the railway having control, or arbitrary adverse action of such railway that the canal in question became useless and was abandoned. (P. 26.) Water traffic on the rivers was destroyed by railways cutting rates at competitive points and recouping any losses thus

made at inland non-competitive points. (P. 22.) When this means failed the railways were permitted to build and operate their own boat lines in competition with independent boat lines and by delivering all through traffic to their own boats, forcing the independent boat lines to attempt to live on traffic originating and ending on the water. (P. 26-27.) Then the railway boat lines cut rates on local traffic to such a point as to bankrupt independent boat lines. This practically drove independent water traffic from the rivers and canals and that condition has existed for many years. There being little, if any, traffic on the rivers and canals for a number of years, due to the conditions stated, attempts to revive waterway commerce find many obstacles due to former railway control and domination, such as an entire absence of waterway terminals with cheap loading and unloading facilities, want of sidetracks or physical connection of railways with the water front, ownership of water front and sites for terminals by railways. (P. 29.) Legislation is necessary to compel proper co-operation between railways and waterways, but the necessity for protective legislation and for the construction of the necessary terminals is now fully realized by the proponents of waterways, and it appears that the necessary legislation, physical connections and terminals will be supplied so as to make it practicable and economical to engage in the business of waterway transportation upon a large scale.

We have shown by the history of waterways and canals in Europe that European waterways passed through the same experience shown to exist at present with reference to American waterways. (P. 55-60.) The result there was the same as here. For a great many years the waterways and canals of Europe were as decadent as American waterways in their darkest hour. Nevertheless, the Europeans by proper protective legislation, by the construction of proper channels, terminals, improved facilities, motive power, boats, barges, etc., and by compelling proper physical connections and co-

operation between railways and waterways have succeeded in building up a great, useful and economical waterways system. (P. 58-9.) What has been done in Europe is practicable to do in the United States and we think we have shown in our original argument not only that the decline in waterway traffic is due to artificial conditions and obstacles created and maintained by hostile railway monopoly, but that the time is immediately at hand when waterway transportation in the United States is about to be revived and take its proper place in the economy of our commercial existence. If the recommendations of the committee on merchant marine, referred to in our original argument on page 50, are followed in addition to the construction of proper terminals, there is no doubt but what the new era of waterway transportation will begin in earnest.

We have shown in our original argument (p. 66 to 71) that the canal rate on the projected canal should not exceed an average of two mills per ton mile, and we think we have shown (p. 72 to 86) that the canal rate on coal should not exceed 1½ mills per ton mile.

We have shown herein that on the exact basis used by the local board to ascertain the available tonnage for 1912 that in that year there was actually transported and available to the canal 4,200,000 tons, and reckoning on the natural increase of the canal territory, as shown by the figures on page 15 in our original argument, in the year 1920 such available tonnage would be increased to at least nine million tons.

We have shown that the handling charges on coal, as found in the report of the local board, are almost wholly misleading and erroneous (p. 78) (91 to 100 original argument and herein.) We have shown conclusively, we think, that the difference between canal and rail transportation of coal or other commodities involves **but one extra handling** and the cost of such extra handling as to coal is from three to five cents per ton and that such cost is the only extra charge

except for 50% of the coal delivered in the Twin Cities there would be an extra charge of five cents per ton. We have shown that there is no deterioration in coal involved in the one extra handling by clam shell (p. 101 to 104 original argument, 95, 133, 141, 146 original argument.) These authorities extend from the United States Bureau of Mines to Thomas P. Roberts, Assistant Engineer U. S. Engineer's Office, Pittsburgh, Pa., whose statement is found on page 133 original argument.

We have shown that the handling charges as to flour, general merchandise and all other commodities, except grain, will not exceed from five to seven cents per ton with the use of modern terminals.

As to grain of all kinds, whereas from the report of the local board it would appear that elevator charges at Duluth and the Twin Cities should in all cases be added to the canal rate to ascertain total cost of canal transportation as compared with rail transportation, we have shown that all elevator charges on grain at Duluth must be added to the rail rate as well as to the canal rate and that as to practically all grain arriving at the Twin Cities, which is afterwards shipped to Duluth, the same passes through elevators and as to such grain there would be an elevator charge whether shipped by rail or canal.

We have demonstrated that the tonnage available to the canal will be sufficient to make it commercially feasible even under present conditions, that is, even without the construction of the canal the commerce between Duluth, Superior and the Twin Cities increasing in the future, as in the past, in 1920 would amount to more than nine million tons. The effect of linking the commerce of the Mississippi with that of the Great Lakes, of opening the new Erie Canal thus providing a through waterway from the Atlantic seaboard via the Great Lakes and the Mississippi to the Gulf of Mexico where it connects with world traffic via the Panama Canal, although impossible to approximate, is a factor which should increase

such available tonnage to an appreciable extent. This question is discussed at length in our original argument (p. 110 to 119.)

CONCLUSION.

From all that appears in the original argument, supplemented by what is herein contained, we think it is clearly demonstrated that this canal project is commercially feasible; that its construction will save the public more than one million dollars per annum upon the tonnage available and to be affected by the operation of such canal at the time when in the ordinary course of construction it could be completed —1920.

Not only will the canal be commercially feasible within the rule laid down by the local board of engineers but we think we have conclusively demonstrated herein that it is a public necessity, if for no other reason, for the effect it would have upon the present traffic monopoly enjoyed by the railroads who own all the through lines of vessels carrying freight upon the lakes and who have a monopoly of all the carrying trade of the lakes except the trade in coal, iron and grain. The construction of the canal, accompanied as it would be by the construction of modern terminals at Duluth and the Twin Cities, would not only furnish a route free from railway control between the Great Lakes and the Mississippi over which the commerce of the Great Northwest could be handled at fright rates on an average of fifty per cent less than the existing freight rates, but the saving on handling charges upon general merchandise including flour upon the immense volume of traffic which would result would constitute in itself an immense public benefit and become a monumental example of the necessity of and benefits to be derived from waterways and modern terminals alike.

All of the considerations surrounding the situation from the view point of public economy and public benefit are overwhelmingly persuasive in favor of the solution of the ques-

tions presented in favor of the commercial feasibility of this project, and we trust this board will so determine.

Respectfully submitted,

LAKE SUPERIOR AND MISSISSIPPI RIVER CANAL COMMISSION OF MINNESOTA.

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By A. O. EBERHART, Governor and Ex-officio Chairman.
IRA B. MILLS, Secretary.

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